GAS JOURNAL

LIGHT ✂ HEAT ✂ POWER ✂ BYE-PRODUCTS

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The Institution Meeting—A Partial Curtailment.

In the prevailing circumstances, it is natural that many members of the Institution of Gas Engineers will not desire to remain away from their works longer than is absolutely necessary for the business and technical proceedings at the Annual Meeting. The President (Mr. Chas. F. Botley, M.Inst.C.E.) and the Council have therefore determined that it will be in the best interests of the members and their responsibilities if the programme for the meeting is carried out from Tuesday morning (Sept. 21) to the sitting on Thursday, and if they abandon the visits on the afternoon of that day, as well as the excursion to Hastings on the Friday. This curtailment is wise, as the important elements of the meeting will be dealt with, without claiming too long an absence from official obligations in present circumstances. The decision will, we believe, assist in enlarging the attendance in London; inasmuch as gas engineers and managers from all parts of Great Britain will be anxious to have the opportunity of conferring with their colleagues, and to be present at the consideration and discussion of matters which materially affect problems having an important bearing upon the future of the industry. We know with what reluctance and regret the President has come to the conclusion that his duty to the members is to forego the pleasure of receiving them at Hastings—an event he had been contemplating with the happiest anticipations. Only the desire to do what was right in the circumstances induced him to agree to the deletion of this final item in the pre-arranged programme. In no wise will the technical and business proceedings be affected, so that we expect, with confidence, to witness a large attendance in London from Tuesday to Thursday, Sept. 21-23.

The Present Lure of Birmingham.

Arrangements for Smoke Abatement Exhibitions and Conferences have to be made a considerable period ahead; and no one can then say precisely what will be happening when the actual event arrives. It is, therefore, no fault of the Smoke Abatement League if the present time is not considered by some folks to be the most opportune for the holding, in the Bingley Hall, Birmingham, of a conference for the advancement of the cause they have at heart, and an exhibition to show what science, inventive genius, and enterprising industries can do to promote more healthful conditions of the atmosphere. Just now (except where the use is being made of some grades of exotic coals which seem to be particularly energetic in producing black smoke in utter defiance of the law) there is not very much to grumble at regarding pollution by smoke. So from Bingley Hall the appeal cannot go forth to look outside at the state of the atmosphere, where every individual will see good reason for using his influence to bring about the use of, and to make it his own practice to use, the agents which will produce heat and at the same time reduce the miasma in the atmosphere, and the terrible pall of smoke which normally obtains in industrial cities and towns, and in most residential places for many months of the year through the combined exhalations of domestic chimneys. However, in the absence of the disagreeable and forcible object-lesson, of course the point that will be made in Birmingham this week and until Sept. 18 is: "Look outside at the pleasant atmosphere conditions that "obtain when coal is not used;" and the question will be asked, "Why not adopt those heating methods and agents which enable our urban populations to enjoy such conditions always?" It is merely a reversal of the object-lesson.

The Chief Medical Officer of the Ministry of Health (Sir George Newman), in his annual report (issued a few days ago), says that, "though it cannot be proved in a logical way that climate or the pollution of the atmosphere with smoke and dust are directly murderous, these conditions are known by experience to be inimical to all forms of life, and every step taken to purify the atmosphere is a contribution to the public health." The Smoke Abatement League are trying to inculcate the principle that it is everybody's duty to make the contribution which lies within his or her power to this comparatively simple process for the promotion of public health. The exhibition which is now running in Birmingham shows how this can be done, for the competing agents are there in abundance—throwing themselves on the good judgment of the public to say which one of them possesses the highest merit in the combination of such virtues as economy, efficiency, range, and reliability. Gas has no fear that it will not continue to receive on these grounds the greatest share of the popular verdict. Both gas and coke have large prominence in the exhibition through co-operation and enterprise. We give a sketch this week, as far as opportunity will allow, of what the combined gas undertakings of the Midlands, the Birmingham Corporation Gas Department, our prominent manufacturers of gas-heating appliances (domestic and industrial), and the "B.C.G.A." are doing; and more will be given next week concerning the conference and events at the exhibition. Of this we are confident, that there will be pilgrimages to Birmingham of gas men from near and far who want to see in collective form not only what the gas industry is doing, but the electrical and other competitors. One feature of the display is to show how gas can play an important part in house-building economy and design by the provision of simple flues for the products of combustion from gas-heated appliances. In this matter of flues, there should be a care only to adopt those which can justify themselves by efficiency and permanence, and not to utilize any flue system which can only be short-lived, or will speedily reveal defects. There is no reason why a gas-fire flue should not be as durable as a chimney, and as effective in all respects, including ventilation. In this relation, the architect and the builder will find demonstration at Bingley Hall which it will be worth while to examine. The hint will be taken by gas undertakings. No doubt, too, those within reasonable distance will see to it that representative consumers pay a visit to Bingley Hall; for education in this way helps to spread information in a district of supply.

Upon the excellence of the gas section we congratulate the Committee appointed by the "B.C.G.A.," and especi-

ally the Sub-Committee, upon whom the greatest amount of the organizing work has fallen. No one will chide us for specially mentioning in this connection Mr. R. J. Rogers, the Chief Superintendent of the Fittings Department of the Birmingham Corporation Gas Department, who is the Hon. Secretary to the Gas Section, and who seems to be a born organizer of such displays. Of congratulation, a substantial share falls to the Midland undertakings (for their co-operative exhibit), the "B.C.G.A.," the Birmingham Gas Department, the manufacturers, and all others who have taken part in the achievement. What has been accomplished deserves an abundant success, and for that we look with confidence.

The North British Address.

A LIGHT touch, combined with sound reasoning, in dealing with matters of serious import to the gas industry assists to make the Presidential Address of Mr. John Wilson, of Motherwell, very profitable reading. Even in the dark days through which the country is passing, he finds matters that are pleasant for the gas industry to contemplate. It is, as the President puts it, not only tragic and humiliating that, in spite of all our boasted advances in education and civilization, it should still be possible for one section of the community to work such havoc in the industrial and domestic life of the country, but it is a condition of things which it ought not to be impossible for an enlightened people to avert. The trouble, however, is that the capacity to inflict harm in the way we have been experiencing is one penalty of the great democratic freedom which the people of this country possess, and which is carried to such lengths that there can be appointed to govern what should be a magnificent and valuable organization men whose words and actions expose their extraordinary mental limitations. This sometimes makes us wonder whether their liberty to do evil to the whole community is not one of the mistakes which mar the boasted civilization of which Mr. Wilson speaks. Many an individual has been put into a lunatic asylum for showing tendencies much less harmful than those of the miners' so-called leaders. We can only hope that such excesses as those of which they have been guilty will be the means by which their power for inflicting harm upon the nation and the miners themselves will be drastically curbed; for the latter cannot surely be blind to the fact that the conspicuous blunders committed by their incompetent leaders have done British mining employment infinite ill, apart from the national injury. But even in these appalling circumstances, the President finds that the strike has been an imposing opportunity for the gas industry to illustrate again its recognition of the trust reposed in it; and in the industry's success in serving the country, and in relieving the domestic misery and lightening the industrial injury arising from a bad combination of power and ignorance, he finds a bright lining to the cloud which has been over us, but which is now in process of dissipation. It was a good thing for the country that the energy and enterprise of the industry had brought about the installation of so many gas-consuming appliances, and that this fact had broadened the views of its administrators as to the measure of protection they must provide for any emergency. There are also lessons in this for the community. For their own protection, they should continue to adopt those methods which are the most reliable in the worst of experienced circumstances. They have found that during the coal stoppage gas has been their salvation, though perhaps now more costly than is the case in normal circumstances. But this, they will realize, cannot be helped. They have also again found what was witnessed in 1921—a cleaner atmosphere and the enjoyment of more sunshine. The lesson should be valuable to the cause of smoke abatement.

The President speaks philosophically on the subject of technical education within the industry. A well-ordered scheme is an essential—more so to-day than ever before—to the well-being of the industry. The thorough training of young men to carry on the progressive and more intensive work of the industry is an obligation upon those who are at present directing its fortunes. These are well-established convictions of Mr. Wilson; and he is hoping that time and experience will enable the Institution of Gas Engineers with its collaborators to improve further the scheme, so as to make it as comprehensive of conditions as is possible, and give to all genuine aspirants for service in the industry the opportunity they require. He views the scheme from the position of Scotland; and any special circumstances appertaining to our friends across the Border are entitled to consideration and, if feasible, to amendment as occasion permits. Certain are we that what is said from the chair of the North British Association will not go unheeded. It has been demonstrated that the scheme does not fit in with the Scottish system of education, as so far developed. There are only four main colleges in Scotland—Glasgow, Edinburgh, Dundee, and Aberdeen; and if certificates are to be endorsed by the Education Department and the Institution, it is necessary that the standard of instruction in all schools should be equal to that at the four great centres. This, in present circumstances, is not possible; and therefore it is the deep regret of the President that many promising young men, through geographical disability only, are debarred from gaining the laurels which will become more and more valuable to aspirants for technical office in the industry. We cannot help sharing Mr. Wilson's regret. We believe in giving all men of parts a fair chance; the gas industry needs such men—more now than before, and the greater will be the need in future. We therefore submit that earnest attention should be given to the President's suggestion on this point, and to another which succeeds it:

> The principle whereby instruction in a recognized school or college is considered of more importance than examination is on sound lines. Where, however, such instruction is denied, something might surely be done to meet the case of genuine self-instruction, by which not a few men in the past have made good. In this case the Institution might examine students in all subjects, and, if satisfied, grant an external certificate.
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> There is also the case of the individual who has taken a recognized college degree in applied science, and then turns his attention to the gas industry as a profession. Under the scheme as it at present stands, he must needs wait a further five years before he can obtain his Diploma. This puts him at a decided disadvantage, as he should be able, with his scientific training, to complete his works' training in less time—say, three years.

However, the President has faith that time will wipe away the difficulties. Already, the National Gas Council have appreciated the position of Scotland in this matter, and by them a proposal has been adopted (as mentioned in the report of the Council of the Association—see *ante*, p. 419) to obtain financial aid which will secure better provision of classes in Scotland. But, with knowledge of requirements, the responsibility rests upon the North British Association of working for the perfection of the scheme, so as to raise its successful operation to the highest possible level. In Mr. Wilson's remarks, we detect good hopefulness of this being accomplished; and with that spirit generally dominating, the distance between educational facility and industrial requirement will assuredly be gradually narrowed.

In the next section of the address, Mr. Wilson gave some interesting particulars regarding the combined Motherwell and Wishaw Gas Undertakings. Upon these there is no occasion to comment at length; but we cannot refrain from congratulating him upon the progress which the concerns have made. Since 1920, the consumption of gas has increased by 99,000,000 c.ft., or 33·5 p.ct. Incorporated in the narrative are several incidents and experiences which the President has encountered in his work. Particularly striking are those relating to the production of sulphate of ammonia. At the Motherwell works, the notable yield of 46 lbs. per ton of coal carbonized is realized; and he admits this is due in some measure to the heavy steaming necessary to produce a gas of a calorific value of 400 B.Th.U. But there is another possible explanation. The ammoniacal liquor from the Wishaw works is sold in its crude state; but an analysis of it indicates that the yield of sulphate would be lower than that at the Motherwell works—probably not more than 35 lbs. per ton of coal carbonized. Yet the coal at the two works is the same; and, this being so, Mr. Wilson concludes that the wide difference in the sulphate

yields is due to the lower temperatures employed in the Wilson-Glasgow continuous intermittent retorts at Motherwell, and the charge being at rest except at the period of partial discharge, while at the Wishaw works (where Glover-West continuous retorts are employed) higher temperatures prevail, and the charge is constantly in a state of movement. To these differences in the carbonizing process, may no doubt be attributed some part of the variation between the sulphate productions. But, of course, sulphate yield is not the primary object of a carbonizing system.

The final section of the address deals with the President's experiences with a coal assay apparatus, from which interesting results have been obtained. From the figures realized with the plant and the results from the ordinary carbonizing plant, factors have been worked out, so that, from any test of coal which has been properly sampled, there can be predicted within a reasonable margin the respective yields under the conditions of carbonization. The President shows, by data and otherwise, that up to the present the assay apparatus has operated satisfactorily, and indicates which coal yields good or bad cokes, as well as information as to the most easily carbonized coal. From numerous tests and various considerations, Mr. Wilson has been driven to the conclusion that, though a proximate analysis may be satisfactory from some points of view, it is of little practical value in determining what a coal can yield, and how it can best be worked. The assay plant which he describes seems admirably to meet his requirements.

The address is full of interest and point, and will, we are sure, induce a study of several features—not only those to which we have referred, but others which are interwoven into the fabric.

A Tentative Move.

THE tight corner into which the Miners' Federation have succeeded in placing themselves by their senseless policy was well illustrated by their proceedings last week. It was an open secret that there were internal dissensions among the members of the Executive as to the line that should be taken to re-open negotiations, and even a division as to whether the old negative policy should still be pursued. There were indications, too, that some members of the Executive were now blaming the delegates from the districts for binding them so long to the negative policy; and the delegates were handing on the blame to the lodges in the various districts, from whom they (according to theory, if not always in practice) receive their instructions. But the fact remains that the negative policy is the one most worshipped by the advanced elements in control of the Federation; and they are the ones on whose shoulders the blame should rest for all that has happened. It is they who have dominated and directed the line of action; and their counsel has all through been accepted by the districts, without much consideration as to whether it was right or wrong. The Executive know definitely that there is no further subsidy for the coal industry, that it is in future to stand on its own ground, the same as other industries, without the taxpayers' support. They know that their action has strengthened the resistance of economic conditions to their demands. They know that they have succeeded in making employment less secure for many of the men who were working in the mines last April. They know of the serious rebelling in the coal-fields; and they are not oblivious of the fact that there are several thousands of men at work to-day, whose return the blarney and soft promises of the hare-brained Cook have been ineffectual in preventing. But worse for the Federation than anything else is that the Executive see the owners are adamant against a national settlement, and the substantial breaking away of the men provides the opening for every district entering into an agreement on its own account. That would mean, if it goes on, the curtailment of the power of the Federation; and its retention to the full is the main reason for the partial change in attitude from a totally negative policy which took place towards the end of last week, and which, had it occurred last April, would in all probability have averted the strike. We doubt, however, whether it will alone be sufficient, in the altered circumstances due to the strike, to bring about a settlement.

The question of a national agreement is not one alone for the owners and the miners; it is one in which the nation is concerned. Just consider that, since the institution of a national agreement in the mining industry, we had in 1921 a three months' strike, and now one of over four months' duration, and it is not yet at an end. In five years, under the operation of the national agreement, we have had nearly eight months' complete cessation of output from the mines! Such a condition of things never obtained in the days of district agreements. The cause is not far to seek; and if a national agreement is allowed to continue in the coal-fields, the country, its industries, commerce, and people will never have any security from similar complete and drawn-out stoppages. The moral is obvious. It is this power, which has done so much harm to the national interests, which the Miners' Federation are now seeking to retain, and by means which are detrimental to the men—by (as they put it) reducing the cost of labour, which can only be through a reduction of wages, instead of maintaining wages by increasing production, and so lowering costs, through a small lengthening of the shift. The Miners' Federation, however foolish they have been in their policy the last few months, are cute enough to see that district agreements would abrogate some of their power, and that a reduction of wages at the present time would give them a better opportunity than hours for again bringing about trouble when they consider the opportunity has arrived. In this there is sufficient explanation of the letter which last Friday evening they addressed to the Chancellor of the Exchequer (in the absence of the Prime Minister), in which they asked Mr. Churchill to convene and attend a conference of the Mining Association and the Federation. The letter proceeded: "We are prepared to enter into negotiations for "a new national agreement, with a view to a reduction "in labour costs to meet the immediate necessities of the "industry." The Government considered this letter constituted a sufficient basis for justifying them in requesting the Mining Association to resume negotiations. Now a fresh crop of difficulties will arise. The basis is a limited one; and Mr. Evan Williams told the Miners' Executive at their recent interview that the matter of an agreement had passed from the hands of the Mining Association, and local agreements now have to be effected through the District Associations, seeing that, apart from the fact that a national agreement has been proved by experience to be inapplicable to the industry with economic conditions varying in every area, those conditions have been worsened in an extraordinary degree through the protracted strike. In other words, the miners have been making a rod for their own backs. The expression "a reduction of labour costs" in the letter to the Chancellor can only mean a reduction of wages; and a reduction of wages will bear hardly upon the men in some areas, whereas a moderate increase of the time per shift would not do so.

However, assisting the miners' representatives to make a move of some sort was the plain talking that is known to have taken place between them and the Labour Party before the discussion in the House, at the sitting called to pass a resolution to continue the Emergency Regulations; also the intimation of the Nottinghamshire Miners' Association that, if a national settlement was not promptly effected, they would negotiate with the colliery proprietors locally; the fact that the imports of coal are daily gaining in strength, and that between May and Aug. 28 the deliveries amounted to 7,600,000 tons; and the boast that Germany can make that in three months the value of her coal exports has doubled. Then the squib regarding the withdrawal of the safety men has left the country unmoved. The Federation controlling the safety workers have not even given any serious attention to the matter. Two or three cases of local withdrawal of the men have occurred, in one or two instances through the implement of intimidation. The services of outside men in one case were secured; in another, through withdrawal of the men, part of a pit has been sealed up, and 500 miners who were previously working in it will be no longer required. The leaders may threaten, but the miners realize that depriving the collieries of the services of the safety men only means the destruction of work for themselves, when they wish to resume.

The move by the Miners' Federation opens up a new phase in this monstrous strike; and there will be keen watching for the developments. The first was to hand during the week-end. The Mining Association have informed the Government that they have no authority to enter into discussions or negotiations on behalf of the District Associations regarding the terms of employment. They therefore refused to take part in a tripartite conference; but they accepted a further invitation to meet the Cabinet Coal Committee to discuss the position of the Association. It is pretty certain there will have to be further relaxation on the part of the miners' leaders. Emphatically clear is the fact that what they wish to retain, and what they are prepared to negotiate upon, are conditions that have been conceived by them to be in the best interests of the Federation, but not of the coal industry and the country at large. The interests of the country must be paramount. What other trade union leaders should consider is the effect that the policy of the Federation has had during the past five years upon industrial employment generally. The Federation have done more perhaps than any other controllable factor to rob other industries of good labour conditions. A balance-sheet of the good and the ill effected in industrial employment by that policy would show a stupendously heavy balance against the former.

Fire Insurance and Gas Heating.

ALL too long our electrical friends have been boasting that the Insurance Offices look indulgently and favourably upon electricity from the point of view of safety. But if the Insurance Offices ever regarded electricity as having superlative merit in that respect, they have had some rude shocks, and have learnt, from expensive experience, that a lighting and heating agent which, if it escapes from its natural bounds, gives olfactory warning of its having done so, has superior merit to an agent which gives no warning, but works in an insidious manner, and is in itself capable (without a match) of igniting any combustible material in the region of the source of unseen mischief. Moreover, the Insurance Offices have now adopted that mighty tome of wiring regulations which the Institution of Electrical Engineers have gradually and laboriously built up, and which prescribes for a thousand-and-one things which must be observed in order to ensure as much security as is physically possible. The Fire Offices have never made any regulations concerning gas. Naturally they would be very lax if they insured premises in which there were obvious defects in installation, until they were remedied. Now we learn that, as a result of negotiations by Radiation Ltd. with the Eagle Star and British Dominions Insurance Company, Ltd.—which is a large and alert concern— an arrangement has been entered into whereby an "all-in" policy (which embraces practically all the risks incidental to private houses), or an ordinary fire policy, will be issued in the case of residential property at a discount of 10 p.ct. off usual rates, where the heating and cooking are done by Radiation gas appliances —one coal fire and a coke-boiler being permitted.

Our interest in this new departure is not due to the fact that Radiation have been instrumental in bringing it about; but on the general grounds of novelty, and the important recognition it gives of the safety of gas heating. It is obvious that an arrangement of this kind would not have been entered into by the Eagle Company were they not convinced, by experience, that in gas heating there is safety for the householder and protection for themselves; and, forsooth, Fire Offices require protection in view of the character of the claims to which they are exposed—some of a frivolous character. At any rate, where gas heating is used, they at once wipe out that abundant class of claim due to sparks from fires and fires originating in chimneys, and some of the claims for fire damage the cause of which is described as "unknown," but in which suspicion is strong. Thus the concession by the Eagle Company is manifestly one which is of mutual benefit to themselves and to gas, of which those responsible for the sale of gas will not be slow to take advantage in their propaganda, for it supplies them with a new and valuable point. No liability, of course, attaches to any gas undertaking in this connection—it is wholly borne by the Eagle Company; and inquiries regarding insurances must be directed to them, and them alone. The question of proof as to the gas appliances in use, where it is desired to obtain the concession, rests with the consumer. But there will be no difficulty in this respect; the Insurance Company being doubtless fully alive to their own interests in the matter. We congratulate Radiation Ltd. upon their initiative; the gas industry upon the important recognition it gives as to the safety of gas over other heating agents. It places upon gas heating the hall-mark of "Safety First," or, in the circumstances, the better rendering "First in Safety."

Coal Stocking.

THE principal executive officers of gas undertakings will now be considering the prospects for stocking coal for the approaching winter. Time flies; and the chances of an immediate settlement in the British coal industry, though the outlook is considerably brighter, are not such as to inspire the hope that it will be possible from home supplies to meet current requirements and at the same time to stock normally for the months of heaviest and erratic gas demand. On the resumption of working at the pits, it will take some little time to get into the pre-strike stride in relation to output; and there is bound to be a lively scramble for supplies. It looks very much as though it will be necessary, in the circumstances, to continue to have recourse to coal from abroad; and, if so, perhaps it will be preferable currently to use that, and to restore, when conditions allow, appropriate stocks from British supplies. That, however, may be looking forward by some weeks. Meanwhile, too, those undertakings with water-gas plants will, even at the sacrifice of some immediate profit, be holding in reserve a supply of coke; for, at the moment, it is impossible to see clearly what will happen, however favourably the signs may be regarded. Fortunately, the powers that be have been in the position to abolish the procedure which has been in force, whereby the disposal of British coal has been regulated by a system of permits. Collieries may now dispose of their available coal without obtaining a permit from the District Committees; but, in so doing, they are required, in the first place, to deal with all definite allocations made by the District Coal (Emergency) Committee, and then to meet any other demands, made either direct or through ordinary trade channels, by classes of undertakings on the "priority list," which includes gas undertakings.

Gas Tariffs.

In our "Miscellaneous News" this week, we publish an interim report by the Committee of the National Gas Council who have been considering the question of gas charges. It will be seen that the Committee are of opinion that systems of charge other than the flat rate will become necessary; and in that there can be complete agreement, having in view future development for heating purposes. The question which has been raised concerning the sliding-scale has no terrors for the Committee. They consider that it should be made lawful, where desired, for companies operating under the sliding-scale to calculate the authorized statutory dividend upon the average price received for gas instead of upon the gross or initial price. It would, they say, prove a very simple change. We are happy to see this opinion. A suggestion has been made that the authorized dividend for one accountancy period could be governed by the average price received during the preceding period. Over that there may possibly be some controversy, seeing that the circumstances of the previous half-year or year might not accommodate themselves well to the profits of the period to which the dividends would apply. With alternative tariffs, the averaging of the prices charged would in most cases be a necessity. It is emphatically pointed out that, in advocating such a change, there is no desire or intention to increase the dividends which are payable in relation to the average price obtained at the time of change. "The sole object sought is the securing of greater freedom in determining a suitable method of charge, accompanied by no disadvantage to the shareholders as a consequence of a more enterprising com-

mercial policy." The Committee suggested that they should continue their labours, and present a further report; and to this the Central Executive Board have assented, at the same time enlarging the terms of reference so as to compass consideration of methods of charging for gas other than the present flat rate system.

Compulsory Use of Electricity.

The trouble among the tenants on the Eltham housing estate of the Woolwich Borough Council—due to the compulsory use of electricity for cooking, and the denial of the liberty to choose gas, if preferred, for the purpose (which has been the subject of a petition signed by 300 of the tenants)—receives further comment in our "Electricity Supply Memoranda" this week.

Road Tar Exhibits.

The exhibition which the Fuel Section of the Society of Chemical Engineers are arranging in Manchester from Nov. 16 to 27 will contain a display by the British Road Tar Association. On the occasion (Nov. 26), a tar symposium is to be held, at which on behalf of the Association a paper will be read relating to tar from the point of view of the road authority. Looking forward, steps are also being taken to reserve space for a display at the Public Works, Roads, and Transport Exhibition, 1927.

Joint Gas and Electricity Committee.

From the preliminary meetings which have been held, it is clear that the Joint Gas and Electricity Committee of the Institution of Electrical Engineers and the National Gas Council find there is no lack of material which they can discuss—it is hoped to mutual advantage. To start with there are the subjects of promoting capital and fuel economy, heating of water, smoke abatement, waste heat, and co-operation in regard to fuel. The appropriate Government Departments and others concerned have been informed that the Committee would be prepared to co-operate with, and assist, the Government in any investigations which may be undertaken in regard to any question falling within their terms of reference.

A Stupid Suggestion.

One of the recent surprises for the commercial world has been the suggestion of the Post Office that commercial advertisements should be employed for the cancellation of postage stamps on envelopes or the covers of wrappers. The idea, of course, is to obtain extra revenue for the Post Office. Apart from the fact that envelopes are the private property of the senders until they reach the destinations to which they are directed, and that the Post Office is paid for their conveyance, the proposal would lead to many curious and awkward results to which the Postmaster-General cannot have given adequate consideration. What an uproar there would be if, on the coverings of literature of the Electrical Development Association, or on the envelopes of electricity undertakings, there appeared an advertisement from the ever-watchful "B.C.G.A."—"Use only Gas; It is the Best Light, Heat, and Power Agent." The same thing, with a change of terms, might occur to the literature of the "B.C.G.A.," or the envelopes of gas undertakings, through the "E.D.A." taking advantage, by the necessary payment, of the Postmaster-General's crude suggestion. Or, again, what would happen, we shudder to think, if on the envelopes or the coverings of literature from Main's, Parkinson's, or Radiation, there appeared the advertisement: "Use only Messrs. . . . . Gas Cookers and Fires." In these competitive times, this sort of thing will not do. The suggestion is too silly for obtaining a scrap of commendation in the industrial or commercial world; and we hope the last will soon be heard of it. Little is said of "C.O.D." to-day. The "P.M.G." should try to become a little more practical in his new ventures. If the scheme is not dropped, we hope the next sure way to kill it will be adopted—that is, for the commercial world to boycott it; and the public should similarly treat the firms who make use of it.

Sale and Distribution of Coal.

Rumour states that the forthcoming report of the Committee appointed by the Government to consider the question of the sale and distribution of coal, will contain both a majority and a minority report. The former will be in favour of forming selling trusts for each coal area, to which all coal producers will be parties. The point upon which the Committee, it is said, are divided is whether materialization of the recommendation can be secured by the voluntary action of the mine owners, or whether legislation for compulsory amalgamation will be necessary. The majority, it is stated, favour the compulsory method as the only way of making the scheme practicable.

A Small Reduction of Unemployed.

The registers of the Unemployment Exchanges show that the total number of persons recorded as unemployed on Aug. 23 was 1,558,900. This was 21,620 less than in the preceding week, but 215,162 more than a year ago. The total of 1,558,900 is exclusive of persons who ceased work in the coal-mining industry on account of the dispute.

PERSONAL.

Mr. and Mrs. T. DENT, of the Wellington Gas-Works, have just celebrated their golden wedding. Mr. Dent has been employed for the past 26 years by the Wellington Gas Company.

On Saturday, Sept. 11, at St. James' Parish Church, Alfreton, the marriage is to take place of Mr. JOHN EDWARD MASTERS, a Superintendent of Messrs. Gibbons Bros., Ltd., the grandson of Mr. Edward Masters (well known in the gas profession), to Miss Doris Clark, of Alfreton.

From Carlisle to India for Missionary Work.

Mr. J. A. Harrison, an Assistant Engineer at the Carlisle Gas-Works, who recently resigned his position in order to take up missionary work in India, was, on Friday, presented at the works with a purse of money subscribed by the employees of the undertaking. The presentation was made by Mr. J. E. Blundell (the Engineer and Manager), who, in the course of his remarks, alluded to the efficient manner in which Mr. Harrison had carried out his duties, and to the good feeling that had at all times existed between Mr. Harrison and all at the works, and assured him that he carried away with him the high esteem and best wishes of them all. Mr. John James Routledge (Works Foreman), in adding his tribute to Mr. Harrison, said he entirely endorsed all that had been said regarding him. He had been very closely associated with Mr. Harrison in his work during the whole time he had been at Carlisle, and it had at all times been a pleasure to work with him. There had been times—and no doubt there would be times again—when everything did not behave as it should do; but, to his recollection, there had been no such occurrence where Mr. Harrison had not been equal to the occasion, and had not satisfactorily overcome the trouble. In bidding Mr. Harrison good-bye and God-speed on his leaving to take up a new sphere of labour, he could truthfully say that his close connection with him during the six years he (Mr. Harrison) had been at Carlisle would remain with him a very pleasant memory indeed; and now, on the eve of his departure, his cordial wish was that Mr. Harrison would meet with success in his future career, and that he would be long spared and abundantly used to carry out the great work to which he was about to put his hand. Mr. Harrison, speaking under considerable emotion, briefly replied. He had, he said, during the six years he had been in Carlisle, made many friends; and, when he looked round and saw his fellow workmen friends around him, and the handsome present they had made him, for which he heartily thanked them, and remembered his other friends in the city, it made the parting somewhat hard. Yet on the other hand, it perhaps in reality made it easier, for he left them knowing he carried away with him their friendship and goodwill. Mr. Blundell, having been thanked for making the presentation on behalf of the subscribers, the interesting little ceremony terminated.

The 38th Congress and Health Exhibition of the Royal Sanitary Institute will be held at Hastings from July 11 to 16, 1927. The Right Hon. Sir William Joynson-Hicks, Bart., M.P. (the Home Secretary), has consented to act as President of the congress.

The Royal Sanitary Institute, of 90, Buckingham Palace Road, S.W., have arranged a lengthy course of lectures, commencing on Monday, Oct. 4, at 6 p.m., for sanitary inspectors. There are also to be inspections of works and demonstrations. The fee for the course is £6 6s.

INSTITUTION OF GAS ENGINEERS.

Programme of the Forthcoming Meeting.

The Annual General Meeting will be held on Tuesday, Wednesday, and Thursday, Sept. 21 to 23, in the Great Hall of the Institution of Civil Engineers, Great George Street, Westminster, under the Presidency of Mr. Charles F. Botley, M.Inst.C.E. (Engineer and General Manager to the Hastings and St. Leonards Gas Company).

ORDER OF PROCEEDINGS.

Tuesday Morning, Sept. 21, 10 a.m.

Minutes of the last Annual General Meeting to be submitted for confirmation.
Appointment of Scrutineers for examination of the Balloting Lists for election of Officers and Council for the year 1926-27.
Presentation of the H. E. Jones "London" Gold Medal to Mr. George Evetts, M.Inst.C.E., for Paper on "The Economics of Gas Production on the Thermal Basis," read in 1925.
Presentation of Diplomas awarded in 1926 under the Institution's Education Scheme.
Nomination of the respective Presidents of the American, Belgian, Canadian, French, German, Italian, Norwegian, Swedish, and Swiss Gas Associations, for election as Honorary Members of the Institution.
Nomination of Mr. H. C. Honey, O.B.E. (late Director, Gas Administration Department of the Board of Trade), for election as Honorary Member.
Introductory Remarks by the President.
Annual Report of the Council for the year 1925-26, and Accounts for the year ended Dec. 31, 1925.

ANNUAL GENERAL MEETING OF THE BENEVOLENT FUND.
AGENDA.

Minutes of the last Annual Meeting to be submitted for confirmation.
Annual Report of the Committee of Management for the year 1925-26, and Accounts for the year ended Dec. 31, 1925.
Other business.

Institution Meeting (*continued*).

Report of the Advisory Committee on Education, to be presented by the Chairman, Mr. F. W. Goodenough, C.B.E.
Fifteenth Report of the Gas Investigation Committee: Methods of Testing Products of Combustion from Gas Appliances.
Discussion of the Report.

Adjournment at 1 p.m.

Tuesday Afternoon, 3.15 p.m.

Paper on "The Development and Reconstruction of the Portslade (Brighton) Gas-Works," by Mr. C. H. Rutter, of Brighton.
Discussion on the Paper.
Sixteenth Report of the Gas Investigation Committee: Studies in Carbonization: Part I. "Influence of Size of Coal."
Discussion of the Report.

Tuesday Evening, 8 p.m.

Reception and Dance by invitation of the President and Miss Botley, at the Connaught Rooms, Great Queen Street.
(It is requested that replies to the invitation be sent to the Secretary not later than Sept 14.)

Wednesday Morning, Sept. 22, 10 a.m.

Introduction of newly-elected Members, Associate Members, and Associates.
Paper: "Investigation of Some of the Factors affecting Carbonization in Continuous Vertical Retorts," by Mr. T. F. E. Rhead, of Birmingham.
Discussion of the Paper.
Report of the Refractory Materials Joint Committee, to be presented by the Chairman, Mr. J. P. Leather.
Discussion of the Report.

Adjournment at 1 p.m.

Wednesday Afternoon, 3.15 p.m.

Paper on "Service to Consumers," by Mr. John W. McLusky, of Glasgow, and Mr. W. B. McLusky, of Halifax.
Discussion of the Paper.
Report of the Institution Gas Research Fellowship, on "The Influence of the Ash Constituents in the Carbonization and Gasification of Coal." Part II.—"Gasification of Special Cokes in Steam," by Mr. C. B. Marson, M.Sc., A.I.C. (Gas Research Fellow), and Prof. John W. Cobb, C.B.E., B.Sc., F.I.C. (Livesey Professor).
Discussion of the Report.

Thursday Morning, Sept. 23, 10 a.m.

Paper on "The Distribution of Gas at High Pressures," by Mr. A. W. Sumner, of Grays.
Discussion of the Paper.
Scrutineers' Report of Election of Officers and Council.
Presentation of Presidential Certificate.
Place of meeting next year.
Votes of thanks.

Advance copies of the Papers and Reports can be obtained on application to the Secretary.

WOODALL-DUCKHAM CONTINUOUS VERTICAL RETORTS.

From the Woodall-Duckham Company we have received a very attractive brochure, giving photographic reproductions of various parts of, and operations in, their well-known plant—each photograph of a part being accompanied by a reason as to why the particular design has been adopted. There are sixteen reasons. The first is scientific heating; the second, sound design; the third, high quality workmanship and material; the fourth, all parts of plant easily accessible; the fifth, easy access to inside of retorts; the sixth, ease of inspection; the seventh, retorts and producers charged from same level; the eighth, simple and reliable coke extraction; the ninth, gas-tight water-sealed door; the tenth, easy removal of ashes; the eleventh, simple gas off-take; the twelfth, one conveyor system for coal and coke; the thirteenth, best waste-heat boiler system; the fourteenth, good working conditions; the fifteenth, guarantees given justified by results; and the sixteenth, low capital cost. Regarding the fifteenth reason—as to guarantees being justified by results—the following table is given:

Size of Installation.	Therms per Ton.		Therms per Retort per Day.	
	Guaranteed.	Obtained.	Guaranteed.	Obtained.
24 retorts . . .	90·00	91·22	409·5	478 9
28 ,, . . .	82·80	86·00	289·8	329 3
16 ,, . . .	85·50	93·18	337·7	365·1
192 ,, . . .	74·70	85 20	448·2	548·6
8 ,, . . .	82·50	92·00	433·1	438·8
8 ,, . . .	82·95	104·00	251·0	404·0

The remaining guarantees—*i.e.*, throughput, fuel, tar, &c.—were also exceeded.

It is mentioned that detailed particulars of these results can be obtained by gas engineers who are interested. In a foreword, it is learned that the Woodall-Duckham plants have a carbonizing capacity of upwards of $7\frac{3}{4}$ million tons per annum.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

Sept. 6-18.—SMOKE ABATEMENT EXHIBITION, at Birmingham.
Sept. 9-10.—CERAMIC SOCIETY.—Meeting of the Refractory Materials Section, at Leeds.
Sept. 11.—GAS SALESMEN.—Annual meeting at Birmingham.
Sept. 14.—NATIONAL GAS COUNCIL.—Meeting.
Sept. 14-16.—INSTITUTION OF PUBLIC LIGHTING ENGINEERS.—Conference at Newcastle.
Sept. 15.—FEDERATION OF GAS EMPLOYERS.—Meeting.
Sept. 16.—MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Official visit to the Smoke Abatement Exhibition, Birmingham.
Sept. 20.—EVENING STAR LODGE.—Emergency Meeting.
Oct. 25, 26, 27.—BRITISH COMMERCIAL GAS ASSOCIATION.—Annual conference at Newcastle-upon-Tyne.
Feb. 16.—"B.C.G.A." MIDLAND DISTRICT CONFERENCE.

INSTITUTION OF GAS ENGINEERS.

Sept. 13.—Emergency and Finance Committees.
Sept. 14.—Advisory Committee on Education.
Sept. 20.—Council meeting.
Sept. 21-23.—Postponed Annual Meeting.

British Standard Specification for Brazing Solder (Grades A and B).—The British Engineering Standards Association have issued a Specification (No. 263-1926) covering two grades of brazing solder. The copper contents for the two grades range from 53 to 55 p.ct., and from 49 to 51 p.ct. respectively; maximum limits being specified for the tin, antimony, arsenic, bismuth, iron, and lead permitted in the alloy. A table is included as an appendix to the specification giving a range of grain sizes of granular solder to which it is recommended that the material be ordered. Copies of this publication may be obtained from the B.E.S.A. Publications Department, 28, Victoria Street, London, S.W. 1, price 1s. 2d. post free.

UNIVERSAL SMOKE ABATEMENT EXHIBITION.

A PRACTICAL DISPLAY IN BINGLEY HALL, BIRMINGHAM.

Many and varied as have been the successes achieved at Bingley Hall, Birmingham, one feels that not since the holding of the National Gas Exhibition there in 1923 can there have been a display of so practical a character and so general an interest as the one organized by the Smoke Abatement League of Great Britain, which was opened on Monday last by the Lord Mayor of Birmingham (Alderman P. Bower, M.B.E., J.P.), and will remain open until Sept. 18.

The exhibition, which is taking place in conjunction with a conference of the Smoke Abatement League of Great Britain, was assured of success from the time of the issue of the preliminary prospectus, which contained the names of a large number of influential Vice-Presidents—among them being Mr. D. Milne Watson, D.L. (President of the National Gas Council), Mr. J. E. Cowen, J.P. (President of the British Commercial Gas Association), Mr. Charles F. Botley, M.Inst.C.E. (President of the Institution of Gas Engineers), Alderman J. H. Lloyd, M.A. (Chairman of the City of Birmingham Gas Committee), Sir George L. Davies, J.P., Sir Arthur Duckham, K.C.B., Mr. J. H. Ellis, Mr. W. Doig Gibb, O.B.E., M.Inst.C.E., Mr. F. W. Goodenough, C.B.E., Sir Hallewell Rogers, J.P., and Alderman H. Wade-Deacon, C.B.E., J.P. The list of organizations announced as giving their patronage includes the Institution of Gas Engineers, the National Gas Council, the British Commercial Gas Association, and the Society of British Gas Industries. Mr. C. Elliott (Secretary of the Smoke Abatement League) undertook the duties of Hon. Organizing Secretary of the Exhibition, with the assistance of Mr. Charles Stanley as Exhibition Director—both largely experienced in work of this character. Bingley Hall itself offers excellent accommodation for such a purpose in the very heart of one of the country's most progressive industrial communities.

Gas interests lost no time in getting to work on the exhibition, with the result that, in addition to co-operative and national efforts, and important displays by the Birmingham Corporation Gas Department, many of the leading firms of gas appliance manufacturers have stands, which are grouped together. The whole demonstrates in a convincing manner what gas and coke can do, not only in the direction of solving an urgent national problem, but to save labour—and therefore the expenditure of money or, what amounts to the same thing, energy—in the home. This is a commercial age; and arguments that can be placed on a cash (or its equivalent) basis are those that are most likely to succeed. The arguments for gas in connection with smoke abatement can therefore be in no danger of refutation. As a matter of fact, the Smoke Abatement League, in organizing this exhibition, have fully realized that, however interesting to the student of social economy may be charts of atmospheric pollution or statistics as to the damage caused by the smoke pall that hangs over the large centres of population, the ordinary citizen asks for practical facts, and must be made to see how his individual case is affected by the efforts of social reformers. The address of the Prince of Wales at the recent meeting of the British Association served, among other things, to make plain to all how purely scientific investigation can deeply influence every-day life.

The history of the smoke abatement movement dates back to Stuart times, when the consumption of coal in the highly inefficient fireplaces of that period in houses that were huddled together alongside narrow streets constituted so great a nuisance that rigorous laws were passed to restrict its use. These laws, however, were doomed to failure, because the reformer of those days had no substitute to offer for what it was desired to suppress. To-day reformers find themselves in a far stronger position, for they are able to draw the attention of the public to the practical substitutes that exist for the smoke-producing bituminous coal now in general use. What they have to show is that such fuels compare favourably with raw coal on a cost basis, and also that they offer all the hygienic advantages of the open fire with increased convenience and cleanliness. As the trade of the country improves, domestic help will be still more difficult to obtain than now, owing to the more attractive and more remunerative positions which industry will offer for female labour. Such scarcity of help will render the adoption of some labour-saving method of heating imperative.

Thus it may be assumed that the public is ready to give smokeless heating a trial, but demands that the new methods shall fulfil three conditions: first, that they shall compare favourably with the old fuel as regards cost; secondly, that they shall maintain the natural ventilation which our habits and climate render desirable; and, thirdly, that they shall reduce household work and enable our standard of comfort to be maintained or improved. Let us see how the gas industry stands in regard to these three conditions.

Cost.—Comparing gas and coal first upon the cost basis, one finds that in the home the use of gas for water heating, for cooking, and for warming all rooms that are not in constant use throughout the day, will not result in any appreciable increase in the annual fuel bill. If, however, gas is substituted for solid fuel throughout the house, one must credit the fuel bill with some of the saving in labour which is hereby made. In the ordinary villa residence such saving is fully equal to the work of one servant; and if the gas bill of an all-gas house is credited with a proportion of one maid's wages and upkeep, the balance will be very much in favour of the new fuel. If domestic help has not been employed before, and the householder is anxious to reduce work, but has no margin for increased fuel costs, the ideal arrangement is to adopt gas for cooking and for warming all rooms not in continuous use throughout the day. For both these uses gas can actually show a saving of cost over coal. In the living room can be fixed one of the new pattern stoves which give an ample supply of hot water and also warm the apartment. Even here there is no need to use coal, as small coke will give excellent results.

Ventilation.—On the score of ventilation, the up-to-date gas fire has everything to recommend it. It has a wide flue opening extending the full width of the fire, and in many cases a secondary flue opening designed to deal with a still further quantity of air by using the injection effect of the hot upward currents. One may rely upon any modern fire not only carrying away all its own products of combustion, but also effecting the necessary air change in the room.

Convenience.—Finally, we come to convenience, and here the advantages that gaseous fuel possesses over raw coal are evident to all. The ubiquitous gas cooker has during the last generation done more to improve the standard of living of the community than perhaps any other one invention. It has not, however, had the consideration that it deserves, and only too often one finds it crowded into some dark and awkward corner.

The advantages above enumerated are amply demonstrated by the various gas exhibits, which are well arranged, and whose appeal is strengthened by the gas cookery demonstrations that are given each afternoon and evening by Miss M. J. Humphries, Diplomée N.T.S.C.

Electrical exhibits are, it should be added here, ranged together on the other side of the hall; and, of course, there are also a number of other stands to which there is no need to make specific reference in these pages. In all, the exhibits number roughly 150.

COMBINED EXHIBIT BY MIDLAND GAS UNDERTAKINGS.

It may be recalled that some information with regard to the scheme for holding the exhibition (which was then in its early stages) was given by Mr. R. J. Rogers at the meeting last March of the Midland Association of Gas Engineers and Managers. From this it appeared that the British Commercial Gas Association had been asked by the promoters to appoint a Gas Committee to represent the industry. This Committee it was arranged should consist of Mr. John E. Cowen (the Chairman of the Newcastle-on-Tyne and Gateshead Gas Company and President of the "B.C.G.A."), Alderman J. H. Lloyd, Mr. A. W. Smith, Mr. Hubert Pooley, and Mr. F. W. Goodenough. A Sub-Committee of local engineers was also formed, consisting of Mr. J. W. Allin, of West Bromwich; Mr. F. C. Briggs, of Dudley; Mr. F. Davies, of Walsall; Mr. E. Hardiker, of Smethwick; Mr. P. N. Langford, of Coventry; Mr. A. W. Smith, of Birmingham (Chairman); Mr. W. M. Mason, Manager of the "B.C.G.A.;" and Mr. R. J. Rogers as Hon. Secretary. The Sub-Committee subsequently received subscriptions from Midland gas undertakings, for the purpose of arranging a co-operative exhibit; and they have been enabled to erect and equip an excellent stand. It was thought best to leave the different manufacturers to display the many individual types of fires, cookers, &c., and to devote the space on this stand to demonstrations of the main types of apparatus and the manner in which they should be fixed. The exhibit is thus of particular interest to architects and builders.

Specially constructed gas-fire flues are shown in brick and concrete, the adoption of which reduces building costs and saves floor space. A recent development is the gas grate or mantel register—a gas fire, mantel, and hearth in one unit—of very neat appearance, suitable for fixing in bedrooms. The best way to connect them to the gas supply is shown, together with the method of terminating the cavity used as a flue for a gas fire.

Geysers which give an instantaneous supply of hot water for bath purposes are shown as they would be fixed in a house, and the correct method of fixing this type of apparatus is demonstrated. Gas-heated wash boilers, which are now almost entirely displacing coal-fired boilers in new houses, are fixed to indicate the approved method of taking off the necessary ventilating flues.

Two pipes, each discharging hot water into a bath, are fitted. In one case the hot water is supplied from a gas-heated circulator, and in the other it is provided by the back-boiler of a specially designed sitting-room grate burning coke. Both systems have hot water storage tanks, and perform the same duties (but in a much more efficient manner) as the back-boiler of the obsolete kitchen range. Various other types of hot water apparatus are fixed. There is an independent coke boiler, de-

signed to burn gas coke and to provide hot water throughout the house, and a small gas-heated boiler which is extremely useful where a supply of hot water is required at a point some distance from the main hot water system.

All the apparatus on the stand has been found efficient in practical use, low in cost of maintenance and fuel consumption, and within the means of the ordinary householder. It is therefore a practical display, upon which the members of the Sub-Committee and their Hon. Secretary, Mr. Rogers, are entitled to hearty congratulations. As to its attractiveness, the accompanying photographs, taken from different positions, may be left to furnish evidence—with the one remark that these were taken two days before the opening of the exhibition, when several minor details of the stand had not quite been completed.

Photographs of other stands will be published next week.

Nautilus "Economy" Flues.

Mention has been made of specially constructed gas flue blocks. One type shown is the "Economy" flue block of the Nautilus Fire Company, of 69, Oxford Street, London, W., with which "Journal" readers are already fully acquainted. They have been in use for a good many years now, and have proved successful in a large number of buildings of every description.

"Novocrete" Gas Flue Blocks.

A new type (also shown) is made by the Novocrete and Cement Products Company, Ltd., of Buckingham Gate, London, S.W. It is said that "Novocrete" flue blocks, unlike ordinary brick flues with mortar joints, remain entirely unaffected by the products of combustion; that even the largest nails can be driven into the material, which will hold them firmly without fracture; and that owing to the high non-conducting properties of the material, there is no risk of decorations, &c., being discoloured or affected by heat. The blocks can be easily cut with an ordinary handsaw; while "Novocrete," though light, possesses great compressive and tensile strength and is fire resisting.

A Flue in Every Room.

Speaking of flues, it cannot be too often pointed out that the modern tendency to build houses some of the rooms in which have no proper chimney flue, is a retrograde one, and greatly to be deprecated. Builders and architects feel that it is necessary to cut building costs; but the elimination of ventilation is not the way to do it. By the use of special flues and flue blocks, a reasonable saving in building costs can be secured, while at the same time efficient room ventilation is ensured. It is to be hoped that all house designers and purchasers will adopt the maxim "A flue in every room."

Another tendency of to-day is to build kitchens which are little better than unventilated boxes. Cooking will always hold pride of place in the scheme of domestic duties; and therefore whatever method of cooking is to be adopted, the kitchen should be light and airy, with a properly constructed flue incorporated in its design.

Birmingham Corporation Gas Department.

Profiting by their long experience in exhibition work, the Birmingham Gas Department have kept their domestic gas stand separate from the display by the Furnace Section or the Coke Sales Section. Following upon lines previously adopted, they have made a point of exhibiting those appliances which have already given good results on the district. A practical knowledge of the performance of the various fires, cookers, and water heaters enables the stand attendants to give confident and correct advice to inquirers. All goods are plainly marked with the selling prices and conditions of fixing, and the public are encouraged to step on the stand and examine the various apparatus.

The Department carry a large range by different first-class manufacturers; and all apparatus before being put on exhibition in any showroom is tested for its performance under working conditions. This practical policy, coupled with the growing public appreciation of the value of gaseous heating in the home, results in this domestic stand always being a popular feature at exhibitions. Care is taken to appeal to the bulk of the gas consumers rather than to load the stand with the most expensive finishes and types of apparatus, which, though excellent in its way, can only appeal to a very limited number of visitors. The Department recognize that these exhibitions offer an excellent opportunity of bringing home to consumers the possibilities that exist for gas utilization in their own homes—well knowing that such use, in addition to assisting in keeping clean the atmosphere of the city, will do much to raise the general standard of living.

The various methods of domestic water heating at reasonable cost and without unnecessary labour are well exemplified on the stand. The more widespread participation in all kinds of outdoor games, and the general improvement in the standard of living, have resulted in a demand for hot water in the ordinary house which was unheard of only a comparatively short time ago. This need for hot water cannot be made to synchronize with a need for warmth; it is often greater during the summer than the winter. Much, of course, depends upon choosing from the many types available the appliance which is definitely suitable for the position and purpose for which it is required. It is felt that the ease and rapidity with which hot water can be obtained in this way will result in an enormous expansion of the use of gas-fired water appliances within the next few years. In America the gas water heater is almost as common as the gas cooker is with us to-day; and another few years may see it equally widely distributed in this country.

Boiling Water for Cafes.

There is also shown on the stand the special apparatus for supplying really boiling water for tea making in cafés and canteens, of which an illustrated description appeared in the "Journal" for Feb. 17 last (p. 420). This was designed to meet a demand for an arrangement in which the heating apparatus would be fixed at a distance from the point where water was to be drawn off, so that no products of combustion or heat would be discharged into the shop, and all that would be visible of the appliance would be the counter fitting and the draw-off tap. The apparatus works on a principle which, though not new, has not, so far as is known, been applied for this particular purpose before; and in actual operation it has proved very satisfactory. Water circulates between the boiler and the point of draw-off at a temperature slightly above normal boiling temperature; but it is not allowed to boil, on account of it being under a pressure greater than atmospheric. The result is that directly the draw-off tap is opened, water issues from it and boils immediately, and is thus in the best condition for making tea—that is to say, freshly boiled and at atmospheric boiling temperature, whatever that may be, under the particular atmospheric conditions. It is found in practice that the water does not lose the air which is contained in it, but comes out fresh and sparkling, and not by any means "flat," as would be the case if the water were stored at boiling point. The fact of its being kept under pressure, of course, accounts for this, as the air is retained in it until the very last moment. An installation of this type is perfectly safe, even in the unlikely event of total failure of the thermostat.

The "Bentee" Fitting.

Readers will also take the opportunity of inspecting in this portion of the exhibition an actual installation of another new appliance which was the subject of an illustrated article on pp. 318-9 of the "Journal" for Aug. 11 last. This is the "Bentee" fitting, which has been designed for use on the outlet flue pipe from gas appliances, such as circulating boilers, wash boilers, cookers, ovens, &c. It acts as a substitute for a bend and a tee, both of which fittings it would be necessary to fix to obtain a corresponding safeguard against down-draught. The use of the "Bentee" fitting makes a much neater job, and is also cheaper, than using a separate bend and tee. The "Bentee" is made in asbestos cement pipe, and should prove to have a life as long as the apparatus to which it is affixed.

Birmingham Gas Department Industrial Research Laboratories.

This exhibit contains a number of furnaces heated by town gas, representing several types which are considered to be up-to-date, and including in their design the experience and development which has taken place through experimental work extending over a considerable number of years. The furnaces are shown with the object of demonstrating the complete absence of smoke when gas is used as a heating agent, and also the ease with which low, medium, and high temperatures may be obtained in the multiplicity of industrial processes which are demanded in modern works practice. They also forcibly bring home to a manufacturer the convenience of a fuel supply "on tap," and the elimination of space usually required for the storage of fuel or ashes, leading to a further reduction in dust and dirt content in the atmosphere of the works. Town gas is used at the present time with great success in practically every known industry, and the small space available on the stand only allows of the furnaces being representative of a few of the more important applications.

Melting Furnaces.—One of the chief features of the exhibit is a new design of high-temperature furnace by the Incandescent Heat Company, Ltd. Gas is used at ordinary town pressure, and air, under a slight pressure obtained with a fan, is supplied through a recuperator tower through which the waste products of combustion are passing counter-current to the incoming air, giving up their sensible heat. This furnace is suitable for obtaining easily very high temperatures, such as are required for the melting of nickel; and at the same time the lower melting-point metals, like brass and gunmetal, can be melted satisfactorily. It may be mentioned that the recuperator tower is also applied successfully to the forging furnaces, giving temperatures up to 1600° or 1700° C.

In many works, even to-day, a tremendous amount of solid fuel is used for the melting of soft metals, such as lead, tin, solder, &c., in large and small quantities; and a standard type of safety metal melting furnace, with cast-iron pot, is shown on this stand, with a view to demonstrating to interested manufacturers that the work can be carried out economically with an absence of smoke and fuel storage. Low-pressure gas only is supplied to this furnace; but where a high speed of production is required, or very large quantities, gas would be used at higher pressures or in connection with an air blast. Simplicity

of temperature control in either instance is a feature of the furnace.

Oven Furnaces.—In the various heat-treatment processes carried out (say) in the modern motor works and general engineering works (including annealing, case-hardening, and hardening operations where only small furnaces are required), the gas furnace over the past fifteen years has practically replaced the solid fuel form of furnace; and with the introduction of the recuperator and regenerator types of town gas furnace, with their low running costs over long-period working, there is no need to-day for a manufacturer to say that he is compelled to use a solid fuel furnace, as temperatures ranging from 500° to 1300° C. are readily obtained. Within this temperature range are included practically all the heat-treatment processes referred to, and temperatures can be obtained economically by means of town gas in any size of furnace, from small ovens having a hearth space 12 in. square to the furnace 12 ft. long by 3 or 4 ft. wide. This does not mean to say that larger sizes of furnaces could not be heated also; but, of course, competition with other forms of fuel becomes keener when this size is reached. On the stand are shown three types of oven furnaces, representing the direct fired, recuperator, and change-over regenerator forms.

The last-named furnace is provided with a regenerator composed of metallic grids, the regenerating chambers being arranged on either side of the working hearth and inter-connected by means of a duplex reversing valve, so arranged as to change-over both waste gas and air flues automatically. The automatic change-over at any required period is effected by means of a trip gear, which is operated by a sliding weight driven along a spindle by means of either a water motor or a small electric motor, or by clockwork; the time period of change-over being adjusted either by a change speed gear mechanism or by variation of the speed of the driving motor. Where possible, a water motor would be used for this purpose, especially when the furnace is used in a hardening shop, where water would be available for quenching purposes, in which case the exhaust from the water motor would be used in the quenching tanks. This gear is demonstrated on a re-heating furnace, designed with a very small thermal capacity, so that quick heating-up from cold can be effected, as would be required when used more or less intermittently. The efficiencies obtainable with a regenerator type furnace of this kind are, as is well known, very high; the exhaust products leaving at a temperature above atmosphere, only sufficiently high to remove the products of combustion. In order to effect uniform heating, the flame travel in the furnace is made to follow a horse-shoe path, and the period of change-over adjusted to reduce the temperature gradient in the direction of flame travel to an absolute minimum. The furnace in question has been designed by Messrs. Gibbons Bros., Ltd., of Dudley, who hope to apply this system of regeneration to furnaces of large dimensions.

In addition to the melting and oven furnaces referred t smaller furnaces are shown demonstrating the use of gas for high-speed and ordinary carbon steel tool hardening, dispensing with the need for the older-fashioned hearth, and a small furnace of the muffle type which is used for jewellers and enamellers. There are also a number of burners that are employed in the adaptation of gas heating arrangements when replacing coal. Further, a range of interesting temperature measuring apparatus is shown as accessories to the furnaces, with a view to demonstrating the absolute controllability of temperature which is obtained with gas heating.

The furnaces and apparatus on the stand represent the products of various well-known makers of gas-heated industrial apparatus, among whom are included the following firms:

Radiation, Ltd.
Incandescent Heat Company, Ltd.
Gibbons Bros., Ltd.
Lucas Furnaces, Ltd.
British Furnaces, Ltd.
James Keith & Blackman Company, Ltd.

BIRMINGHAM COKE SALES DEPARTMENT.

The Coke Sales Branch of the Birmingham Gas Department are showing under working conditions the three main ways in which gas coke can be employed in the home. First, an open fire of the "Bell" pattern demonstrates how small coke can be used for room warming. Secondly, a "Bijou Eagle" combination grate gives a bright smokeless kitchen fire, and also an ample supply of hot water for all domestic purposes. Thirdly, 1 in. breeze is seen burning in an "Esse" slow combustion stove. Such a stove fixed in the small square halls so popular in up-to-date villas will keep them pleasantly warm with very little trouble, while the ascending heat will keep staircase and landings free from draughts. Samples of different types of coke, indicating the grading employed by the Department, are on view.

EXHIBIT BY MIDLAND GAS UNDERTAKINGS.

BRITISH COMMERCIAL GAS ASSOCIATION.

The British Commercial Gas Association's stand is divided into two sections. In the larger section are exhibited specimens of the main bye-products recoverable from coal when carbonized at the gas-works. The central attraction is a gas fire (symbolical of clean, healthy heat) embedded in coal, from which a blaze of colour emanates indicative of sunshine and health. Two panels of pictures at the extreme ends of the stand portray a striking contrast—the cleanliness, economy, and hygiene of using coal the right way (as gas), compared with the dirt, drudgery, darkness, and disease that come of using coal in the wrong way (in its crude form).

The exhibit is made of arresting interest to every visitor. Descriptive cards are provided for each bye-product, so that those with a scientific bent can trace its origin and note its uses. The bye-products are so arranged and classified as to give a rough indication of the processes by which they are obtained. Others, not concerned with the scientific details, can see clearly at a glance the invaluable service which the gas industry is giving to the public, to the manufacturer, and to the nation by

providing the essential heat units of coal in the clean, dirt-free form of gas, and retaining the valuable bye-products so indispensable to industry, trade, and the daily life of all.

A specially effective display of fresh fruit and vegetables, rivalling in size and beauty a flower show, demonstrates attractively the beneficial effects arising from a judicious use of sulphate of ammonia. The effect of the extensive use of gas on the health of the nation is shown by photographs of children diseased through the absence of sunlight due to the coal smoke of our cities and cured by the power of sunlight.

The second section of the stand shows a modern scullery, such as can be equipped in any house, newly-built or old. It depicts the housewife's workshop—as, indeed, the kitchen-scullery is—equipped to give maximum comfort, convenience, efficiency, and economy with absolute minimum of dirt, drudgery, and disappointment. The latest pattern in gas cookers stands always ready for use; the gas-heated wash copper makes home laundry a light and easy task; while the little geyser fitted over the sink provides an ever-ready supply of hot water for washing-up.

A most effective back-screen arrangement, brilliantly lighted by overhead gas lamps, gives an idea of an open door and window through which can be seen the healthy sunlight of a beautiful suburb, such as would be familiar if everyone used smokeless fuel—gas or coke—and the air were no longer polluted by the smoke from coal, inflicting injury on property and health.

Radiation Limited.

The feature of the Radiation stand is the series of gas cookers incorporating the following special developments in design: (1) Special oven with flue outlet at the bottom instead of the top. (2) One burner only in the oven, instead of the usual two. (3) "Regulo" automatic oven-heat control, by which the temperature of the oven is set at a given figure and automatically maintained by the device without further attention. (4) "Rado" boiling burners on the hotplate, which are most efficient, economical, and at the same time thoroughly hygienic and free from odour. Examples of this latest design of cooker are the "New World" in "upright" and also in models with the oven beside the hotplate, and in different finishes; and the Radiation "Junior" cookers, with similar features but smaller ovens, and various exterior designs.

Radiation "Standard" gas grates, with the patent "Injector-Ventilator," form another outstanding exhibit, enabling visitors to see the many pleasing designs of gas fires that now incorporate this extremely popular ventilating device. These gas grates ventilate as they warm, changing the air of the room as effectively as the best coal fire; the heat being evenly radiated, entirely without draughts.

The section of the public that still prefers the appearance of the old-fashioned coal fire is well catered for in the Wilson's "Sunbeam" gas fire and John Wright's "Hotspur" fire, which are both designed to fit in the coal grate opening without disturbing the canopies, &c., and are very popular, giving as they do a coal fire's bright appearance, while at the same time eliminating all the drawbacks—such as dirt, &c.—that are inseparable from burning raw coal.

Fine examples of the latest gas grates are shown from the productions of the six Radiation firms:

Arden Hill & Co., Acme Works, Aston, Birmingham, and London.
Davis Gas Stove Company, Ltd., 60, Oxford Street, London, W. 1, and Luton.
Fletcher, Russell, & Co., Ltd., Palatine Works, Warrington, and London.
Richmond Gas Stove and Meter Company, Ltd., 164-172, Queen Victoria Street, London, E.C. 4, and Warrington.
Wilsons & Mathiesons, Ltd., Carlton Works, Armley, Leeds, and London.
John Wright & Co., Essex Works, Aston, Birmingham, and London.

Parkinson Stove Company, Ltd.

The Parkinson Stove Company, Ltd., whose principal factory is situated at Stechford, Birmingham, are exhibiting a prominent selection of gas heated and other appliances particularly suitable for housing schemes. Early in the year 1919, when a public effort was launched to overtake the housing shortage throughout the country, the Parkinson Stove Company introduced to the market special gas heated labour saving appliances suitable for artisan and other dwellings, which gave more efficient and hygienic results than the old-fashioned coal heated domestic appliances, and at less cost.

A feature is made of the Parkinson "Built In" gas fire register, in one complete unit, which, in conjunction with gas fire flues built into the walls, leads to a considerable saving in costs of labour and material, and at the same time adds to the capacity of the rooms by the elimination of chimney breasts. The London County Council and the Liverpool Corporation early in their building schemes recognized the advantages and the saving in cost which could be effected by putting gas fires into bedrooms and small sitting rooms, in place of the old coal fire grates which, in the case of bedrooms, were hardly ever used. It was seen that, not only did the design and appearance of these "Built In" gas fire registers give a more pleasing effect to the lay-out of the bedrooms, but they offered the occupants of the houses a ready and cheap method of obtaining, on a cold winter morning or evening, a fire for half-an-hour or so, in order to temper the atmosphere of the room during the period of dressing or undressing. The consumption of these fires (which are made in five-radiant and seven-radiant sizes) averages from about 20 to 25 c.ft. per hour, so that half-an-hour's warmth in the morning or evening can be had at practically a halfpenny—an infinitesimal cost for such a comfort. It was further recognized that in case of sickness an even temperature could be kept in the sickroom, that no dust or dirt or smoke as from a coal fire would worry the patient, and that no attention would require to be given to the heating unit, which, in the case of a coal fire, might be very annoying in serious sickness.

In addition to the benefits conferred upon the tenants of the houses, it was soon discovered that the saving in bricks and material, by eliminating chimney breasts to carry away smoke from coal fires, was so great that municipalities all over the country began to test-out for themselves the advantages of gas fires for bedrooms from a cost of construction point of view, with the result that in many of the largest cities throughout the country—such as London, Liverpool, Manchester, Newcastle-on-Tyne, Carlisle, Glasgow, Edinburgh, Dundee, Belfast, and Dublin, to mention only a few of the more important cases—they have installed these "Built In" gas fire registers in many thousands. No case has come to light of a tenant desiring to go back to the old coal fire system of heating. To those interested in smoke abatement and the purification of the atmosphere of our large industrial centres, these facts must appeal, as it will be recognized that the results from this point of view of the adoption of so many thousands of gas fire heating units in bedrooms, displacing the old smoke-emitting coal grates, must be very pronounced. It is to be hoped that those in authority in connection with the provision of houses throughout the country will see the great benefits which would be conferred on the community at large if the adoption of gas fires and gas cookers in new houses was made universal.

R. & A. Main, Ltd.

On the stand of Messrs. R. & A. Main, Ltd., of Gothic Works, Edmonton, is shown a selection of labour saving and hygienic gas heating and cooking appliances bearing the trade mark "Main." There are upright gas fires of round top and square top designs, for placing in front of existing coal grates or for building in. Also the "Cinderella" inset gas fire in a special cast-iron surround finished in coloured enamel. This fire, which fits into any coal grate simply by removing the front bars, when in action has the appearance of a glowing coke fire at its brightest. There is shown one of a series of gas-fire mantels specially designed for housing schemes, bedrooms, &c., and supplied as complete units, comprising the fire, mantel, shelf, hearth, and kerb, ready to be fitted into the wall opening.

In gas cookers there are models to suit every domestic requirement, including the "Maintop," in which the oven and hotplate are placed on a stand at a convenient level for working without stooping. Any of the "Main" cookers may be obtained with the "Conservor" oven. As its name implies, this oven is a heat conserver; and besides effecting a great saving in gas, it bakes on every shelf. For instance, tea cakes and scones can be beautifully browned on the bottom shelf, as well as on any other.

As an improvement on the kitchen coal range, a very efficient combination for convenient cooking and providing an abundant hot water supply is shown in the "Maintenance" gas cooker and "Solar" domestic boiler.

Cannon Iron Foundries, Ltd.

A considerable portion of the stand of the Cannon Iron Foundries, Ltd., of Deepfields, near Bilston, is devoted to their "Challenge" and "Centenary" gas cookers, new inclined gas fires, and "Corna" gas wash boilers, in addition to which there is an excellent display of other gas appliances, many of which are in operation.

The "Challenge" cooker is made in four convenient sizes and fitted on a stand. The oven tap is provided with a gravity locking device. The "Centenary" is an eye-level cooker of pleasing design. Where space is limited, the "Cot" (single cased) or "Cottage" (double cased) cookers serve many useful purposes. Being somewhat small, they may be placed in confined positions, without occupying space needed for other purposes. They are raised on a stand to a convenient height for using.

Among the advantages claimed for the new inclined gas fires is that they warm the body and face in addition to the feet, the sloping radiants being set at the correct angle for directing the heat upwards as well as horizontally. Other important features are silence in burning, ample ventilation, and economy in gas consumption. In the "Equator" gas heated steam radiator the consumption of gas is automatically controlled by a patent valve; and there is also an automatic air safety valve. One of the most serviceable patterns is the "Belle," which is fitted with argand burner and "Vitreosil" chimney. It has a copper reflector, and gives a very pleasing effect.

The "Corna" gas wash boiler is a new pattern, so named

because it is made to fit into any corner of a scullery; the top being triangular in design.

SIDNEY FLAVEL & CO., LTD.

The first noteworthy feature of the stand of Messrs. Sidney Flavel & Co., Ltd., of Leamington, is their latest cooker—the "Flavel"—which possesses a number of new features. There is a neatness of design and simplicity about this that suggest cleanliness. The hotplate is a loose frame, which rests on four supporting arms, and carries the burners and double griller. To clean the top of the cooker, it is only necessary to lift out the hotplate frame with burners complete, and a clear space is left. The gas supply being incorporated in the front member of the hotplate, remains in position, neatly concealing the supply taps. All burners and components comprising the hotplate are loose, and can be lifted out for cleaning. The gas supply connection is mounted on a double elbow, which forms a universal joint, enabling the gas supply to be brought in from any point either above or below the cooker. This connection may be transferred from the right to the left of the cooker, if required. "Flavel" patent burners can be fitted in place of the ordinary drilled hole pattern. The oven door acts smoothly and softly, as the latch passes over a running wheel. The oven burners are easy to remove; and the oven door can be taken off quickly.

All oven fittings are removable, leaving a clear surface of enamelled steel free from obstructions. When a small brass nut with a knurled head for hand use, combined with a hexagon for a spanner if necessary, is unscrewed, the oven linings can be removed. These are shallow trays of mottled grey enamel, and in each tray is a solid sheet of Bell's cellular asbestos, held with an enamel locking flange. The asbestos sheets simply lift out, and cannot slip. As a further means of preventing loss of heat, there is an ingenious method of casting flanges at the joints of the oven, and sealing these joints by means of asbestos rope, which, of course, is held in a groove.

The firm have lately put a number of new gas fires on the market; and these are shown for the first time at the exhibition. The series run from plain inexpensive patterns to gas fires of Period design. All these new fires are fitted with the "Flavel" self-centring burner, which is of the silent type, and is constructed so that the fuel radiants will always fit centrally over the gas flame. Then there is the "Leamington" convection-radiant gas fire, which may be described as a radiant gas fire of the usual pattern, with a heating chamber fitted behind the fire. The air from the room is drawn into the heating chamber through an inlet in the fender, placed above floor level to exclude dust, and is gently circulated into the room from an opening at the top of the canopy. When lighted in a cold room, this type of fire will, it is said, produce a comfortable atmosphere in an unusually short space of time, as, combined with the radiant efficiency, a certain amount of convected heat is simultaneously brought into being.

GENERAL GAS APPLIANCES, LTD.

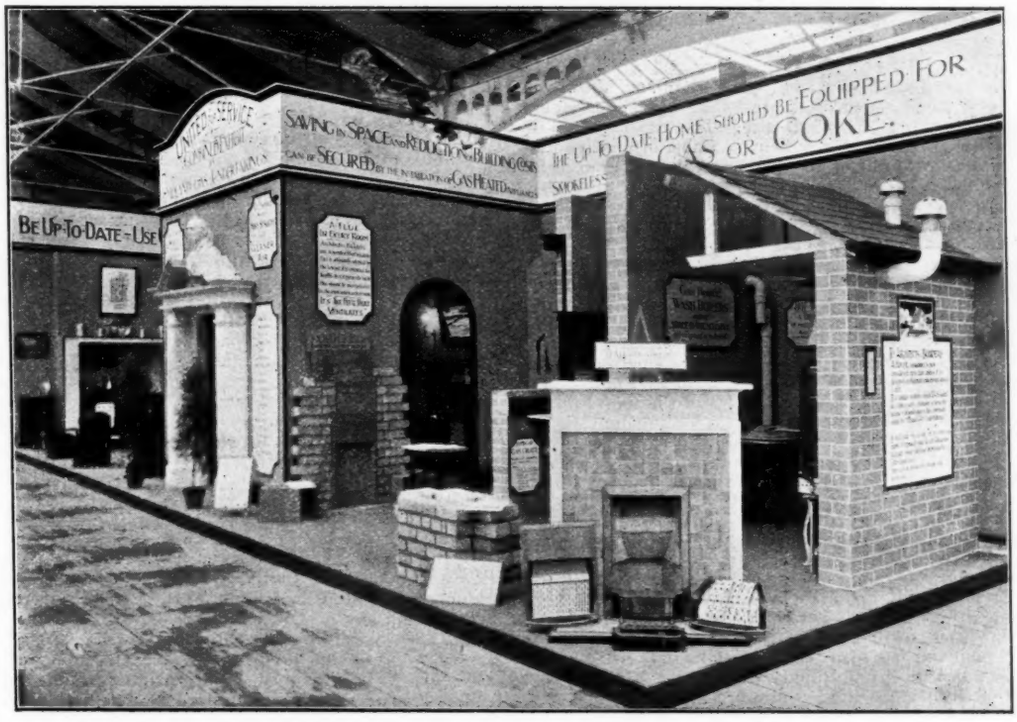
A selection of their latest specialities is exhibited by General Gas Appliances, Ltd., of Guide Bridge, Manchester. There are their "Dainty" and "Triumph" cookers; and a new range of cookers—"Victor" No. 1 and No. 2—specially designed to meet demands for a moderate priced cooker of high-class finish, and with white enamelled exterior. In gas fires the range is a wide one, both in design and finish; and it includes the new "Regal" series, in antique and lustre copper and satin brass finishes.

EWART & SON, LTD.

A feature of the stand of Messrs. Ewart & Son, Ltd., of 346, Euston Road, London, N.W., is a large size "Califont" water heater, supplying hot water at the rate of 16 gallons a minute, and providing a reliable service at any hour of the day or night. In connection with housing schemes the demand for labour-saving types of heaters is becoming more and more urgent, and the "Supreme" water heater, an example of which is on exhibit, meets the present-day tendency in a thoroughly satisfactory manner. It provides a hot bath, also kitchen sink and lavatory basin, without any more trouble than merely turning a tap wherever hot water is wanted. There are, of course, geysers for both large and small requirements.

For factories, &c., where it is customary to afford such facilities to the employees, the "Factory" boiler will provide boiling water in large or small quantities. The collecting tank is part of the apparatus; and from this boiling water may be withdrawn at a number of taps, so that many workers can be provided with half-a-pint or more of boiling water in a few minutes.

For heating water in bulk—*i.e.*, required for storage purposes or for circulation through radiators or heating pipes—the "Radion" circulator has been found very efficient, and to give good results at small gas consumption. A combination of storage cylinder and heater is found in the "Radion" cylinder, which may be fixed in any convenient position with little water pressure, and will supply hot water in bulk to a number of taps at the same time. It is made in capacities varying from 10 to 40 gallons; and larger sizes can be supplied if required.


BE UP-TO-DATE-USE
SAVING IN SPACE AND REDUCTION IN BUILDING COSTS
CAN BE SECURED BY THE INSTALLATION OF GAS HEATING
BE UP-TO-DATE HOME SHOULD BE EQUIPPED FOR
GAS OR COKE.

SHOWING HOW BUILDING COSTS MAY BE REDUCED.

WOODALL-DUCKHAM VERTICAL RETORT AND OVEN CONSTRUCTION COMPANY (1920), LTD.

An island site is occupied by the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., of 52, Grosvenor Gardens, London, S.W. In the centre there are erected three fireplaces. One of these fireplaces is fitted with a semi-well grate, in which is seen burning dry, graded, gasworks coke, showing that this material, when suitably prepared, provides a solid smokeless fuel for domestic purposes. In the second fireplace is fixed an anthracite stove burning graded coke. In the third fireplace is fitted one of Main's "Cinderella" fires, burning town gas.

Models are shown of :

1.—The Woodall-Duckham continuous vertical retort.
2.—The "W-D" inclined chamber, in which bulk carbonization on intermittent lines is carried out.
3.—The "W-D" intermittent vertical chamber.

Each of these carbonizing systems has its own particular application.

The Woodall-Duckham Companies also exhibit a model of the latest type of coke oven—the Becker oven. There is a scale model of a 50-ton per day "T.I.C." distillation plant, in which tar is distilled in contact with molten lead. A new development in the drying of coal is demonstrated in the model of the Carpenter centrifuge. The large machines, of which this is a model, can dry coal at the rate of 100 tons per hour, down to 5 p.ct. moisture. Arranged round the stand are a selection of photographs of plants of various kinds which the Woodall-Duckham Companies have installed in different parts of the world in recent years.

A section of the stand is devoted to apparatus required for the testing of the refractory materials employed in the erection of modern carbonizing plants. Included in this apparatus are a special gas-fired furnace, in which expansion tests are carried out, and a furnace for the determination of refractoriness. A full range of samples of refractory material at the various stages of test is on view, and also microscopic slides showing sections of typical refractory materials. In this section is also shown a gas-fired coal testing furnace, which has for its object the reproduction, on a small scale, of the results obtained in practice when coal is carbonized. Polished cross-sections of the coke made from various types of carbonizing plant are exhibited.

Spencer-Bonecourt, Ltd.

Messrs. Spencer-Bonecourt, Ltd., of Parliament Mansions, Victoria Street, London, S.W. 1, are exhibiting under steam a small town gas-fired boiler—2B size. The capacity of this boiler for its size is remarkable, it being capable of a maximum output on natural draught of 280 lbs. of steam per hour from and at 212° Fahr. The boiler is fitted with a patent automatic gas regulator, which automatically controls the supply of gas to the burners in such a manner that gas is only burnt as and when required. The operation of the regulator is briefly this : When the pressure of steam in the boiler reaches a certain predetermined figure, the supply of gas is automatically shut off, except for a small amount which is by-passed to keep the burners alight. As the steam is used, the pressure naturally falls, and the gas is automatically turned on again. The pressure range of the regulator is very wide, and easily adjusted to any desired figure by the simple turning of one nut. The feeding of this particular boiler is accomplished by an ordinary injector, but should it be desired automatic feeding may be incorporated; the apparatus varying according to whether steam is being generated at high or low pressure.

The makers' patented system of gas firing is applied to this boiler. No primary air is introduced into the gas, and thus all dangers of back-firing and explosion are eliminated. Also, the complete absence of mechanical parts makes for a simple and reliable steam generating plant. This type of boiler is manufactured in a very wide range of sizes; and the larger units are fitted with mechanically operated fans for creating the necessary draught. Boilers of this description are suitable for burning all types of combustible gas.

Another exhibit consists of a No. 4 standard pattern Spencer-Hopwood patent vertical multitubular water tube boiler, which is fitted with a Kermode steam jet oil-firing apparatus for burning crude oil. This boiler, which is not at work, is said to be one of the most efficient vertical boilers on the market. It is constructed in such a manner that full use is made of the heat available; while the design is such that all heating surfaces are readily accessible for cleaning.

O. Bruster & Richardson.

The inventors and manufacturers of the "Glow-Worm" coke boiler for domestic hot water supply—Messrs. O. Bruster & Richardson, of 4, Lloyds Avenue, London, E.C. 3—show, in addition to the original "Glow-Worm" boiler, as a working model the "New Junior Glow-Worm," which has been evolved to meet the demand for a boiler having a large open fire space. This boiler has three doors in front—the bottom one to fall down, and two small doors at the top to open right and left, thereby enabling the whole of the fire to be exposed to view. This effects the dual purpose of giving sufficient warmth in the kitchen (where the kitchen is used as a sitting room), and at the same time slowing-down the production of hot water when large quantities of hot water are not required.

Another working exhibit is the new "Glow-Worm" open coke fire. This fire, invented by Dr. J. S. Owens, has been designed to burn coke in an open fire, giving the major portion of its heat by radiant rays. A certain amount of convected heat is given off; but at no time is this sufficient to cause the slightest feeling of stuffiness. In ordinary open fires, the combustion of the fuel is from bottom to top. Ash is formed and needs to drop downwards into the ashpan, but the air for combustion rising up through the fuel tends to keep the ash in the fire, and when the fire is poked throws the fine ash out into the room. With the "Glow-Worm" fire, combustion is from back to front, through a wedge-shaped fire basket. Ash, in falling, is carried through into the ashpan; and however vigorously the fire may be poked, no ash or dust comes out into the room. To promote the fullest possible amount of radiant heat, the ashpan is pushed backward, when the whole of the fire exposed to view will become a glowing incandescent mass. The addition of new fuel does not obscure the pleasing appearance of this incandescent fuel or in any way interfere with the amount of radiant heat sent out into the room. By pulling the ashpan forward, a certain amount of air, instead of passing through the fire, will go under the fire and up the flue. In addition to this, air constantly passing under the canopy of the fire thereby ventilates the room. As the flue at the back of the stove terminates at a point higher than the mouth of the canopy, a true injector effect takes place; and the fire will therefore effectively ventilate any room. The fire itself has been constructed with a tapered back, so that it will partly fit into the average existing coal grate. In this way, the projection into the hearth is reduced to the minimum, and a pleasing appearance is obtained. The consumption of coke is from 1 to 1½ lbs. per hour; and the cost, therefore, of using this fire is considerably less than the average coal fire, with its attendant dust and trouble. A gas lighter is provided, and there is no need at any time to lift out the remainder of the previous day's fuel. Fresh coke can be added on top of the cinders at the bottom of the grate.

Coke stoves in porcelain enamel, and also gas fire mantel registers, are shown.

William Grice & Sons, Ltd.

The "Minerva" heater and warm air circulator, which is shown by Messrs. William Grice & Sons, Ltd., of Fazeley Street, Birmingham, was described and illustrated in the "Journal" for Sept. 1 (p. 472). It is a self-contained unit designed to meet all modern requirements in respect to warming and ventilating almost any type of premises. The furnace is really a low-temperature gas producer, with effective means for the ignition and complete combustion of the gases in the chamber above the fuel bed. The furnace is constructed of heavy cast-iron plates, and its exterior is provided with thin radiating ribs projecting into the air-heating chamber. Surrounding the furnace are two annular chambers. The inner one is effectively insulated, and the outer one is provided with the air intake. From this air intake, the air is, by induced current, drawn into the heating compartment; and it is then expelled at a rapid rate of flow from the top of the heater. There is no possibility of the air being contaminated with the products of combustion. The air necessary for combustion is supplied through a separate louvre, which can be closed practically air-tight; and a damper is provided in a branch of the stackpipe, which can also be used for checking the draught through the fire.

Wollaston Gas Producers (Manchester), Ltd., and Cochran & Co. (Annan), Ltd.

A combined exhibit has been arranged by Wollaston Gas Producers, Ltd., of Bank of England Chambers, Tib Lane, Manchester, and Messrs. Cochran & Co., Ltd., of Annan, N.B., and it comprises a standard Cochran vertical boiler rated normally to evaporate 650 lbs. of water per hour, easy steaming, at 100 lbs. pressure, fired by a Wollaston patent producer furnace, which, it is claimed, more accurately fulfils the scientific and practical essentials of perfect combustion than any boiler furnace hitherto devised. There are also accessories and sundry instruments. The boiler is under steam, and the evaporation and thermal efficiency are logged from hour to hour.

Alexander Wright & Co., Ltd.

Though not themselves exhibiting, Messrs. Alexander Wright & Co., Ltd., of 1, Westminster Palace Gardens, Artillery Row, Victoria Street, London, S.W. 1, are co-operating with Wollaston Gas Producers, Ltd., at the stand mentioned above, by loaning some of their instruments—

S.A.W. Patent CO_2 Indicator and Recorder.—This is said to be the latest and simplest form of instrument; and it will not only continuously record, but continuously indicate (on a large open scale), the percentage of CO_2 in the flue gases. All fluid levels are self-adjusting, and the smallness of the amount of attention required is claimed to render this instrument the most practical ever placed on the market.

Simmance's Patent Multiple Dead Beat Gauge.—A number of gauges in one case are designed to take the place of batteries of gauges where space is limited. Any ranges of pressure or vacuum or combinations can be covered. A "three-in-one" gauge is suggested as being suitable for use on gas-works—the top pointer showing the vacuum on the inlet of the retort house governor, the centre pointer showing the foul main vacuum, and the bottom pointer showing the exhauster pull. Other combinations can be made, suitable for any plant where pressure or vacuum variation is desired to be indicated. On boilers, particularly when working on the pressure draught system, the "three-in-one" gauge is of great use.

Solid Fuel Bomb Calorimeter—Low Pressure, Roland Wild

Pattern.—The calorimeter consists of a combustion chamber with a screwed cap suspended from the cover by a stout tube furnished with a valve. The water vessel is of copper, and is surrounded by an outer casing heavily nickelled; the annular space between the two vessels forming an air jacket which effectually prevents radiation and absorption, thus rendering the rise in temperature of the water an absolutely true guide to the heat given off by the fuel. An agitating paddle or stirrer is provided, working in the water vessel, and being manipulated from the outside of the cover. A sensitive Fahrenheit thermometer, 40° to 100°, is fitted; the scale being divided into tenths of a degree, and easily reading to 1/20°. In one pattern the firing is effected by a hot wire, and the stirring paddle is worked by hand; while in another pattern the firing is electrical, and the stirring by spring motor.

Turbine Furnace Company, Ltd.

The Turbine Furnace Company, Ltd., of 238B, Gray's Inn Road, London, W.C. 1, exhibit a full-size boiler front and side flues, showing a 7 ft. 6 in. diameter Lancashire boiler fitted with "Turbine" patent furnaces.

An interesting feature, being exhibited for the first time, is a patent incandescent baffle, the action of which is as follows: The existing grate is extended for a distance of about 2 ft. 6 in. by the addition of a special firebrick "grate." During cleaning operations, the incandescent fire is pushed back on to this "grate," greatly facilitating the removal of clinker from the firebars. After cleaning, the fire is pulled forward on to the ordinary grate, and firing continues in the usual manner, the firebrick "grate" acting as the base of an incandescent baffle through which preheated air passes and mixes with the unconsumed carbons, which are ignited on a patent incandescent brick baffle. All the faces of this baffle are either vertical or at too steep an angle to trap any flue dust. Provision is made for cleaning out the chamber under the baffle of any flue dust that may fall through; and a valve for the positive regulation of the correct amount of secondary preheated air necessary for perfect smokeless combustion is fitted.

Brief Mention.

Messrs. Arthur Raybould, Ltd., of Britannic Works, Fleet Street, Birmingham, devote attention to the making of gas pendants and burners particularly suited to the needs of gas companies, and have as a speciality the "Auto" patent inverted burner, which has been designed to stand rough usage, and is efficient, non-corrosive, economical, and easy of adjustment. Included on the stand are samples of fittings supplied by Messrs. Herbert Jones & Son.

Handsome art metal adjustable surrounds for gas fires are displayed by the patentee and manufacturer—Mr. F. Turner, of 61, Summer Hill Street, Birmingham.

The James Keith & Blackman Company, Ltd., of 27, Farringdon Avenue, London, E.C. 4, exhibit fans and blowers for various purposes, and also dust separators.

The Hurry Water Heater Company, of 39, Broad Street, Birmingham, show geysers, &c., for housing schemes.

The Mitchell Conveyor and Transporter Company, 45-50, Holborn Viaduct, London, E.C. 1, display a model of the final extension to the Nechells Power Station, which they have supplied with boilers and pulverized fuel plant, and also photographs of complete British power stations they have built.

Model Boiler House.

A feature of the exhibition is a model boiler house designed and organized by Mr. C. Elliott. This exhibit, in the creation of which twenty manufacturing firms have co-operated, occupies an area of approximately 100 ft. by 60 ft., and has been planned to give a thorough working demonstration of approved methods of securing maximum power at minimum cost, and with the least possible waste in the form of smoke. Prevailing industrial conditions explain the fact that a number of important matters connected with boiler practice have not received attention. Among the firms contributing are:

Bromford Tube Company, Ltd., Rocky Lane, Aston, Birmingham.—Steam main.

British Arca Regulators, Ltd., of Windsor House, Victoria Street, London, S.W. 1.—Reducing valve.

John Thompson, Ltd., of Wolverhampton.—Lancashire boiler and water tube boiler.

METHODS OF INSTALLING GAS APPARATUS.

Meldrums, Ltd., Timperley, near Manchester.—"Koker" type of stoker and hand-fired forced draught furnace.

George Kent, Ltd., Biscot Road Works, Luton.—Boiler load indicator and Kent's 1925 Venturi feed water meter.

James Gordon & Co., Ltd., of Windsor House, Kingsway, London, W.C. 2.—Cope's automatic feed water regulation equipment, complete, fitted to the water tube boiler; also the Gordon high and low water alarm, which visibly and audibly indicates high or low water in the boiler drums. "Duplex mono" combustion recorders, recording CO_2 and unburnt combustible gases on one chart. A full-sized Gordon patent sectional superheater installed in the downtake of the Lancashire boiler. Gordon automatic multiple-leaf damper operated by the Gordon electro automatic control gear.

Edward Bennis & Co., Ltd., of Little Hulton, Bolton.—Chain grate stoker.

G. & J. Weir, Ltd., of Cathcart, Glasgow.—Vertical feed water pumps.

The majority of the firms named have also individual stands in the exhibition, at which these or other of their specialities can be further examined.

MIDLAND ASSOCIATION VISIT.

It has been arranged to have an official visit of the Midland Association of Gas Engineers to the Exhibition on Thursday, Sept. 16, when the morning will be devoted to an inspection of the various exhibits, and the afternoon to listening to a lecture by Sir Arthur Duckham, K.C.B., on "The Contribution of the Gas Industry to Smoke Abatement." At the conclusion of the lecture, tea will be served in the Conference Hall.

ANNUAL MEETING OF GAS SALESMEN.

As already announced, the annual meeting of the members of the Gas Salesmen's Circles will take place at the Exhibition at 2.15 next Saturday afternoon, Sept. 11. After an opening address by the Chairman (Mr. F. W. Goodenough, C.B.E.), there will be brief statements by Chairmen on the work of the Circles; and these will be followed by an address by Miss Gladys Burlton, B.A., on "Turning Complaints into Goodwill."

GLOVER-WEST VERTICALS AT TORONTO.

Among the papers presented at the recent convention of the Canadian Gas Association was one by Mr. C. G. Herring, Chief Draughtsman in the Works Department of the Consumers' Gas Company of Toronto, which dealt with recent extensions to the Station "A" plant of the Company. This paper was noticed on p. 376 of the "JOURNAL" for Aug. 18; and we now give extracts from the portion dealing with the new vertical retort installation, together with two illustrations, reproduced from the August issue of "West's Gas."

As early as the beginning of the war, the necessity of extensions to the capacity of our coal gas plant at Station "A" was known.

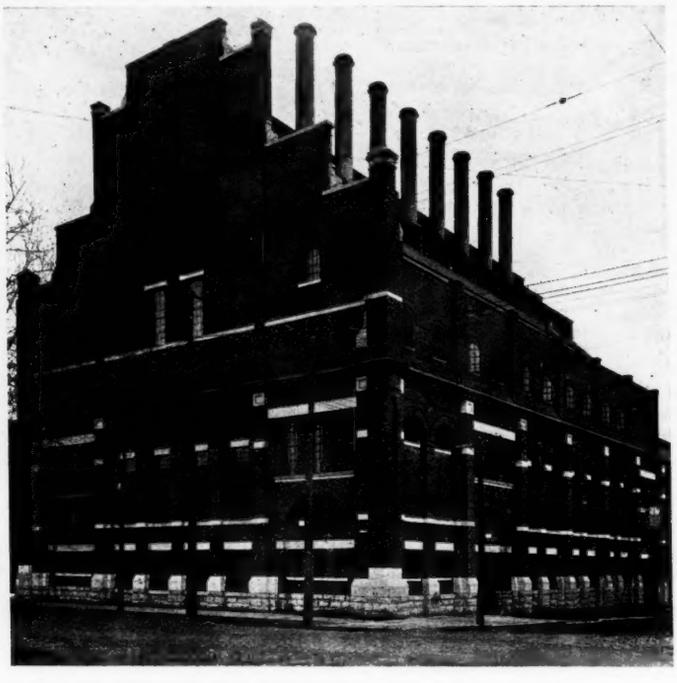
The carbonizing plant at this time, and until the recent modernization was started, consisted of 360 back-end horizontal retorts, 26 in. by 16 in. by 9 ft. long, in a very fine retort house 293 ft. long by 76 ft. wide. In considering the type of new plant to be adopted, we were faced with the necessity of providing not only a plant that would be capable of giving us the utmost possible economy of working, but also one that would be suitable for the location of our manufacturing plant. Station "A" is centrally located in Toronto, within three-quarters of a mile of the hub of the city, and one block south from the main cross street; and the avoidance of smoke, dust, and other nuisances, was of prime importance. It should be noted that adjacent to the retort house is a large knitting mill employing several hundred women.

After careful consideration, it was decided to adopt the Glover-West continuous system of vertical retorts, and a contract was awarded to West's Gas Improvement Company for the installation of eight settings, with provision for a ninth, of eight 40 in. by 10 in. by 25 ft. long "steaming" retorts. In this system, the coke is cooled before leaving the retort coke chambers, and the whole plant housed-in, giving a total absence of those features that would be objectionable to the surrounding district.

The new plant tied-in very well with the existing material-handling equipment and manufacturing plant. Occupying very small space, it was built in the north end of the horizontal house, displacing less than half of the horizontal settings. You will realize that we undertook to continue the working of the major portion of our existing coal-gas equipment and to tie-in the plant temporarily so that no complete stoppage of manufacturing the gas occurred during the erection of the new plant. As soon as the verticals were operating, the remainder of the horizontals were shut down, and are now dismantled.

RETORT HOUSE ALTERATION.

To accommodate the increased height of the vertical settings, it was necessary to dismantle the existing roof-work, and the side walls were carried up 12 ft. in the same architectural design. A new roof was provided, and the weight of the trusses carried mainly from the coal bunkers above the retort settings, which in turn are carried from the main front and back buck-stays. The steel trusses were ingeniously designed with hinged joints and roller guides to accommodate vertical expansion of the setting steelwork and to avoid any incalculable stresses due to such expansion.



ELEVATION OF NORTH GABLE WALL OF RETORT HOUSE AFTER ALTERATION.

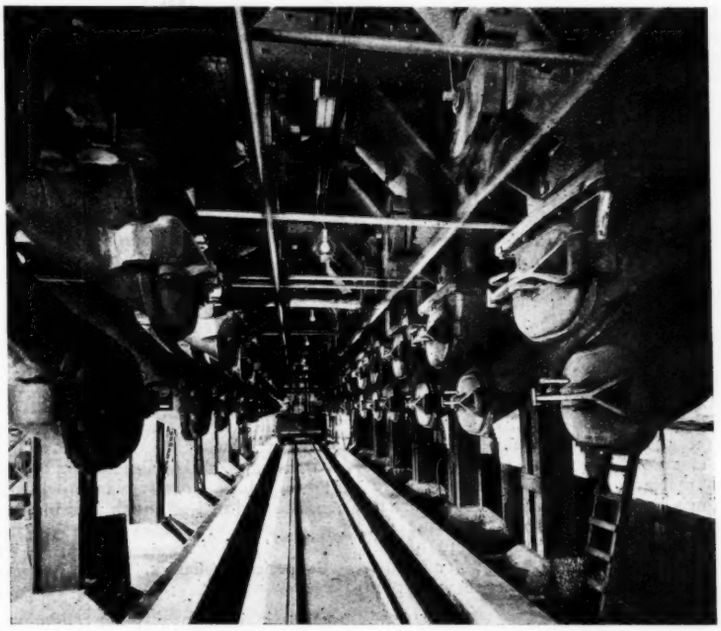
VERTICAL RETORT INSTALLATION.

Each setting of the new plant is built as a unit separated from the neighbouring settings by an expansion space, and is equipped with its own CO producer and waste gas chimney; while each retort is a self-contained unit, with coal-feeding hopper and valve, gas offtake and valve, and self-sealed coke-discharge chamber. The retorts are heated in units of four in line by the combustion of CO from the producer with pre-heated secondary air in horizontal chambers, one above the other over the length of the retort. The air is preheated by circulation around the base of the retorts, and in addition is brought up to approximately combustion chamber temperature before entering the chambers. This is done by passing it through passage-ways in the setting division walls; the air from the base circulating chambers passing up flues in the back wall, and through these cross-passages to the front, where it enters the combustion chambers close to the producer-gas intake nostrils. Before leaving the setting, the waste gases

circulate around the top of the retorts, heating the incoming coal.

The producers are of the step grate open type, are provided with a reservoir of coke above the curtain wall arch, and are charged every four hours. The bottom of the curtain arch at the producer back, behind which the gases rise to the setting uptakes, is at all times below the level of the coke; and consequently the depth of fire is always constant, giving absolutely uniform producer-gas quality. This constant quality is assisted by the open-front type of grate, which gives slow passage of primary air through the whole area of the fire, avoiding hot spots and minimizing clinker.

Coal is brought to the retort plant by one of the belt conveyors which handled coal to the horizontals, and is discharged to an automatic Avery weighing machine, from which it is fed to either one of two lip-bucket conveyors that encircle the entire settings. These lip-buckets, which also handle coke from the bottom discharge chambers, discharge coal into 48-hour supply bunkers above the settings; the remainder of its passage to and through the retorts being accomplished by gravity. Coal and coke handling can proceed simultaneously, as the coke is discharged to a cross-conveyor leading to the old screening plant and store before the buckets arrive at the coal-receiving point.



COKE DISCHARGE AND LIP-BUCKET CONVEYORS.

Of distinct advantage in the operation of the continuous system of carbonization are the ease with which the working of the retorts can be adjusted to secure the maximum results from varying classes of coal received, and also the elasticity in varying the calorific value of the resultant gas. Each retort coke extractor is fitted with a ratchet drive with adjustable speed mechanism; and the resultant coke at each draw shows whether or not it is advisable to change the speed of charge travel. If there is any sign shown of incomplete carbonization (which is easily seen by the colour of the coke), the retort can be slowed-up by the simple means of altering a pin in the ratchet mask while the operating mechanism is working. Such need might occur due to change in coal or lowering of bench heats.

The adjustment of calorific value is made by the admission of more or less steam to the retorts, each retort being fitted with a special steam valve with regulator.

WASTE-HEAT BOILERS.

The waste heat is utilized from the entire vertical plant in two horizontal Kirke boilers by Spencer-Bonecourt, Ltd. Each boiler is 8 ft. in diameter by 18 ft. long between tube plates. Each contains 414 fire tubes 1¾ in. in diameter, giving a heating surface of 3420 sq. ft. The working pressure is 120 lbs. gauge, and the steam superheat 100° Fahr. The noted steam capacity in working of each boiler equals 8600 lbs. per hour.

Attached to the boilers is an induced-draught fan of the Sirocco type, direct coupled to a De Laval steam turbine, running at 5000 R.P.M., with helical reduction gear 5 to 1. The horse power at maximum conditions is 40 B.H.P. There are two 6 in. by 8¼ in. by 18 in. vertical type "Weir" feed-water pumps, one used as a standby. The water supply is taken off the plant service mains at a temperature of about 100° Fahr., and subsequently heated to 200° Fahr. by the turbine exhaust steam in an open Cochrane feed-water heater, after being treated in zeolite water softeners. The water from the softeners is metered on its way to the pumps. The boilers, fans, water-heaters, and softeners are erected on a steel structure level with the producer operating stage; the operator having no need to leave the floor, as everything is under his eye. The boilers are fitted with automatic water controls and high and low water alarms.

The waste-heat flues from the settings are in two groups—one of four settings, and one of five settings—with downtakes to each boiler. These flues are lined with fire-brick; and between this and the steel shell is a non-conducting lining of "Silo-cell" brick. The dampers controlling the waste heat from the settings to the chimneys or boilers are operated on the top of the setting. Each boiler superheater consists of a horizontal cluster of solid-drawn weldless iron tubes contained in the fire-brick-insulated brick-lined steel casing at the inlet of the boilers; the superheater being installed at the base of the chamber, out of direct passage of the gases. The main headers are in an outside location—an extension of the chamber.

WORKING RESULTS.

It may be added that the following results of the working of the vertical retort installation were recorded for the month of June last:

Daily make per retort	73,560 c.ft.
Make per lb.	7·035 c.ft.
Make per English ton	15,750 c.ft.
Calorific value, gross	497 B.Th.U.
Fuel account	12·9 p.ct.

Coating a Natural Gas Main.

The Southern Counties Gas Company have completed the construction of a 12-in. steel main 84 miles in length for the transmission of natural gas from Ventura to Los Angeles, at a cost of $1,500,000. Various engineering problems, including suspension bridge work, had to be solved, but the work was finished in approximately three months. To prevent corrosion, the Company employed "Petrolastic asphalt" as a coating material throughout the whole length. Mr. C. W. Geiger, writing in the "Gas Age-Record," explains that, before the main was placed in the ground, it was given a coat of "Oronite" priming solution, which prepared the surface of the pipe for the application of the hot asphalt. When this priming solution had dried, the asphalt, heated to 350° Fahr., was poured over the pipe, and mopped on as it lay in a horizontal position. The excess material dripping from the under side was caught on a strip of canvas. By working this canvas strip backwards and forwards during the pouring, the entire surface was coated. A second coating was applied in the same manner before the work was complete. Incidentally, the application of this protective coating served another purpose. The line was placed under pressure while the hot asphalt was being applied; and bubbles in the coating caused by the escaping gas made possible the detection of any leaks, which were corrected forthwith.

ELECTRICITY SUPPLY MEMORANDA.

THE petition to the Woolwich Borough Council of 300 residents on the Eltham Estate, requesting that they should be allowed to exercise their discretion as to whether they should use gas or electricity, is testimony to substantial dissatisfaction, which no words of Mr. G. W. Keats, the Electrical Engineer, can remove. Such a number of residents would not have taken up the attitude they have done if all was well in their experience with electricity for cooking. There would have been no petition if this had been the case; and Mr. Keats must not assume that all men, excluding himself, are fools. He has written to the "Birmingham Post" regarding a reference to the subject in its London letter; and his communication shows that the Council have decided to be mightily stubborn and arrogant in continuing to compel tenants of their houses to be also patrons of their electricity undertaking, whether or not they are agreeable. We suppose the next thing they will do is to give a list of the bakers, butchers, grocers, tailors, and drapers whom they insist their tenants shall patronize. Interference with the freedom of their tenants concerning the commodities they prefer for lighting, heating, and cooking is something which has never been statutorily constituted part of their administrative functions. How would the members of the Council like to be individually deprived of the exercise of their wills as to whom they should patronize for such purposes? There would be a grave revolt on their part against such despotism. Mr. Keats, in his letter, states that the limitations of space and height of the rooms caused the Council to decide that electricity should be the illuminant, which is a confession that, from the point of view of cubical capacity, the rooms are not the most healthy for occupation by such families. According to the letter, when the houses were originally built, the South Metropolitan Gas Company were approached with a view to the installation of gas cookers only on the estate; but they suggested the condition that they should, in addition, be allowed to canvass for lighting. They did not say it should be a compulsory condition that gas lighting should be employed where a gas-cooker was installed—only that they should be allowed to canvass. As a matter of fact, if gas-mains were laid within the distance from a house specified by Act of Parliament, the Gas Company could not refuse to supply if requested to do so by the tenants. Evidently the Council were afraid of the canvassing by the Gas Company for lighting; for rather than permit them to do it, they decided to dispense with gas altogether.

Compulsory Use of Electricity.

Assertion and Complaint.

Mr. Keats declares that the "only" complaint against the use of electricity is the time taken to boil water; but he says improvements are being made in this respect, and science should be able to remedy the trouble. This shows a real grievance; but it is not the only complaint. Mr. Keats should again read the "Kentish Mercury" article, to which reference was made in the "JOURNAL" last week. There he will see that coal grates have been installed, and oil stoves brought into use; and 300 signatures of tenants are appended to the petition, which, from the experience of the signatories, denies the economies of electricity, and endorses its limitations. The petition does not confirm Mr. Keats in his allegation that the time occupied in boiling water is the "only" complaint. It is the petitioners who are anxious to have the right to use gas instead of electricity, if so preferred; and they have had sufficient experience to know that economy, efficiency, and greater latitude of operations are on the side of gas, and not on that of electricity. Notwithstanding the petition, Mr. Keats states that the Council are about to equip another 500 houses; so that they mean to persist in their compulsory policy. It is time the Newport (Mon.) clause was applied generally to housing estates, so that the liberty of the people is not infringed through municipal ownership of electricity supply, as is the case on this Eltham Estate.

The Newport (Mon.) Clause.

Our electrical friends may conveniently have forgotten the clause referred to in the preceding paragraph. References to it have been made in various issues of the "JOURNAL"—first on May 13 last year (p. 444), and since. It is a sub-section to a clause in which the Corporation sought power to develop lands belonging to them; and it reads: "The Corporation shall not make or impose under the powers of this section, any term, condition, or restriction with respect to the form of light, heat, power, or energy to be used in any house, shop, office, warehouse, or other building, or on any lands, or with respect to the taking from any particular local authority, company, body, or person of any form of light, heat, power, or energy." Events have shown that the clause should be generally applied.

Electric Slot Meters.

The annual report of the Electricity Committee of the Sheffield City Council states that the scheme for the installation and supply of electricity to houses by slot meters (which was approved by the Council in January, 1925) has been "exceedingly successful." It has been the means of introducing the "advantages" of the electric light into houses which would probably never have taken on the system. Up to the end of March, 1926, 4276 of these installations had been connected to the supply mains; and over 100 of them have been purchased by consumers. It is stated that, through these installations, 199,173 units were consumed during the year—an average of 46 per installation, although a number had not been connected the full twelve months. What would be more interesting would be the financial results from capital expenditure to profit, including a statement to show the number of consumers who have been unprofitable owing to low consumption, and the number who have been profitable through good consumption.

Glasgow's Finances.

The annual report of the Electricity Committee of the Glasgow Corporation is again highly interesting. It shows that, after providing for interest on loans, sinking fund, and depreciation, there is a deficit on the year's operations of £29,329, which has been met by reducing the reserve fund. Revenue shows a decrease of £47,115, which is said to be principally due to depressed trade conditions; but, later on, it is seen that the number of consumers in the year increased by 4035, or 6·55 p.ct., while the sale of current to private consumers advanced by 6,830,025 units, or 3·9 p.ct. We rather fancy the growth in the use of electricity at the lower charges has had much to do with the reduction of revenue, seeing that the average price received for current during the year was 1·507d. per unit, as compared with 1·639d. The position would have been much worse had there not been a decrease of £50,141 in working expenditure, attributable to reductions in coal, repairs and maintenance of buildings, machinery, plant, mains, cables, &c. It was providential that repairs and maintenance claimed so much less in this particular year.

Connected Appliances.

The report also tells us that there was again a substantial increase in the number of appliances installed. In domestic and business premises, the following appliances are connected: 2946 cookers, 141 wash-boilers, 28,403 radiators, 2939 kettles, 18,275 irons, 2034 vacuum cleaners, and 1546 sundry appliances, making a total of 56,284, of which 9260 are hired out by the Department. These appliances represent a demand of 76,062 KW.; and the consumption of electricity therefrom has increased 29 p.ct. over that of the previous year. It is said that the scheme inaugurated two years ago, whereby old tenement properties may be wired (the payments by the tenants being spread over a period) continues to attract. The number of these houses now electrically equipped is 1352. The total number of motors in use and supplied from the Corporation mains at May 31 was 17,820, of a total horse-power of 142,331; and the units consumed amounted to 118,827,865. Last year the figure was 17,297 motors, of a total horse-power of 139,958, taking 119,650,294 units. Turning to the revenue account, it is seen that the rental of apparatus on hire amounted to £5853. On the other side of the account, we see that repairs of apparatus on hire amounted to £10,893 (nearly twice as much as the rental); and the amount written off motors, cookers, and arc lamps, at 10 p.ct., was £4707. The figures (without considering interest on capital, &c.) do not suggest that the hiring business is a profitable one.

Comparative Gas Data.

It may be of interest to give some comparative figures relating to the Glasgow Corporation Gas Department, in view of the fact that the doings of the Electricity Department so often come into the limelight. It will be seen that the sale of current to the private consumers increased by 6,830,025 units, which is equal to 233,040 therms. The Gas Department had an increase of 430,062,906 c.ft., of a calorific power delivered of 477 B.Th.U. per cubic foot, or 2,051,400 therms, which figure is 1,818,360 more than the increase in therms of the Electricity Department. Excluding privately-owned appliances, the Gas Department had on the district 173,782 cooking stoves and ranges, 21,760 grills, 66,773 boiling burners, 74,229 gas fires, 6002 radiators, 1830 water-heating appliances—a total of 344,376, compared with 319,987 in the previous year. These figures can be compared with those for electricity, as given in the previous paragraph.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

Annual Meeting in Glasgow.

[Unfortunately we are unable to give in this issue our report of the general proceedings and the discussions on the papers read at the Annual Meeting of the above Association, owing to our representative having been knocked down by a motor-car on his way home from the meeting. He is suffering from severe bruises and cuts, but hopes to be able to dictate his report during the present week. Meanwhile, we reprint the Presidential Address, and the paper by Mr. Robinson, of Annan.]

PRESIDENTIAL ADDRESS

OF

JOHN WILSON, of Motherwell.

We have reached another milestone in the history of our Association, and it is my desire at this time to convey to you, the members, my sincere thanks for the honour you conferred upon me when you placed me in the Presidential Chair during this year, the sixty-fifth since the Association's inception.

The position carries with it responsibility and calls for a fair amount of time, which, by the way, it is not always easy to find, especially during a year such as we are passing through. That we have been able to carry out our various programmes throughout the season is entirely due to the sympathetic and helpful co-operation of your Council, backed by the push and energy of our indefatigable Hon. Secretary. Your President, by virtue of his office, has a seat on the Council of the Institution of Gas Engineers for a year. As far as the Institution work is concerned, a year passes too quickly, as the District Representative is only beginning to find his place, as it were, when he has to retire to make room for the new man. Nevertheless, there is no doubt of the value of this representation on the Institution Council, both to the individual and to the Association he represents.

The year's activities in gas, as in other phases of industry, have been very seriously affected by the unfortunate coal stoppage which started on May 1. It is a tragic and humiliating state of affairs that, in spite of all our boasted advances in education and civilization, it should still be possible for one section of the community to work such havoc in the industrial and domestic life of the country. Every cloud, it is said, has its silver lining; and I think you will agree with me that if there is any silver lining at the present time, it is the splendid way the gas industry has kept going, very often in difficult circumstances, supplying the community with light, heat, and power. The present impasse has again demonstrated how fully gas enters into the life of the nation. Indeed, the use of gas has become so general that even at critical times like these it is not possible to ration the supply of gas without creating something akin to chaos. Consequently, gas undertakings have been practically forced to give a continuous supply in order to keep in motion the wheels of industry in general. This has not been done without committing the undertakings to considerably increased expenditure. Is it too much to hope that the consumer will remember his indebtedness to the gas industry, when later he is called upon to pay the piper?

SMOKE ABATEMENT.

Once again we have had a practical demonstration of the advantages that would accrue were smoke abatement a real, instead of—at least meantime—a visionary, project. Town and district take on an entirely new aspect. Looking down on some of our industrial towns just now, there is revealed to the delighted eye beauties hitherto hidden behind the usual pall of smoke. It is a matter of regret that such ideal conditions should only occur at times of coal shortage, but it should spur us on to take a further step towards the complete abolition of smoke from our cities and towns. After all, smoke is waste; and our country cannot afford to dissipate her natural resources of coal much longer. Conservation of coal is becoming a growing necessity, and must needs receive the serious attention of the whole community.

"Though our smoke may hide the heavens from your eyes,
It will vanish and the stars will shine again."

The gas industry is doing yeoman service towards this end, working away quietly and continuously, adding every year to the considerable number of appliances in use. We are called a conservative people, and in no instance with more reason than in our preference for a coal fire. If one could imagine for a moment that gas had been first in the field for cooking, and for heating our homes, what chance would coal ever have had to oust it? I say none, not even on the score of cost. Just imagine some enterprising salesman trying to push coal as a fuel. He would have to explain to the housewife that a special grate was required, that sticks and paper were necessary to kindle it, that the fire needed replenishing at intervals, that the ashes had to be carted away, that fire irons had to be provided, that there had to be a place to keep the coal, and so on. He would play his trump card—cheapness—and would then in all probability be shown the door. Mrs. Housewife would certainly not agree to take on all these additional burdens had she been accustomed to having the means for heating and cooking supplied to her with the expenditure of such a small amount of personal energy as is used in the simple turning of a tap. Such is the terrible power of custom, use and wont, conservatism, or whatever you like to call it. Happily, the younger generation is becoming more alive to the advantages of labour-saving devices, and the modern maid is not going to tolerate the drudgery in the home which her mother accepted as her lot. This is all to the good for gas, and we must see to it that we do not let any of our opportunities slip.

In this connection the British Commercial Gas Association continue to do good work. Their "Thousand-and-One Uses for Gas" must be a revelation to the lay individual, as it indeed is to the more enlightened of the gas industry. One is astonished at the lengthy list of processes into which gas enters; and, moreover, new applications are being developed every day.

One of the most noteworthy achievements in the development of apparatus recently has been the application of a bottom flue outlet to gas cookers. There is no doubt of the success of this departure from recognized practice. It removes entirely the effect of chimney pull; the complete oven being maintained at a more uniform temperature, thus eliminating the claims of the electric cooker on this score.

THE PRESIDENT.
Mr. John Wilson, of Motherwell.

There has also to be acknowledged the serious attempt on the part of appliance manufacturers to standardize and cut down to a minimum the number of spares. One observes, too, that more attention is being given to practical utility in the design of cooker tops, which must be a welcome change to the domestic consumer, who, after all, prefers convenience with efficiency, even if it does mean a slight sacrifice of scientific perfection.

THE EDUCATION SCHEME IN SCOTLAND.

It is gratifying to find that the march of progress continues. We can look forward with great hopes for the future of our industry. We have had bequeathed to us a splendid legacy which we dare not accept without a due appreciation of the responsibilities entailed, especially as to-day's work is necessarily of the nature of intensive cultivation, as compared with yesterday's tilling of the virgin soil. The Institution probably realized this when they very wisely set to work to create their Education Scheme. We have now had some three years' experience of this scheme. It was not to be expected that a new departure of this kind would immediately achieve the desired purpose, and we understood that time must be allowed to give the scheme a fair chance of proving itself effective. To this end much has been accomplished, but much remains to be done before one can say that the scheme is functioning smoothly. The period of probation has demonstrated that it does not quite fit in with our Scottish system of education.

Little objection could be taken to the scheme were it a full-time course, because, in that case, a student would naturally

migrate to the required technical centre for the period of instruction. Owing to the scheme being a part-time one, there are undoubtedly many promising young men who, because of their geographical situation, are unable to take advantage of it under present conditions.

In Scotland the standard of the scheme is that of the Central Institutions; and if the certificate is to be endorsed by the Education Department and the above Institution, the instruction received outside the four main colleges must equal their standard. Unfortunately, with few exceptions, this is not obtainable in the affiliated schools; consequently, the student is practically limited to one of those colleges. It is to my mind rather a tragedy that in Scotland, of all places, a "lad of pairts" placed outside the scope of these colleges should at the very outset of his career have his hopes of successful certification so completely blasted—and that, too, by the very means which were intended to provide for it.

The principle whereby instruction in a recognized school or college is considered of more importance than examination is on sound lines. Where, however, such instruction is denied, something might surely be done to meet the case of genuine self instruction, by which not a few men in the past have made good. In this case the Institution might examine students in all subjects, and, if satisfied, grant an external certificate.

There is also the case of the individual who has taken a recognized college degree in applied science, and then turns his attention to the gas industry as a profession. Under the scheme as it at present stands he must needs wait a further five years before he can obtain his Diploma. This puts him at a decided disadvantage, as he should be able with his scientific training to complete his works training in less time—say, three years.

The Scottish Committee of Advice recognize the difficulty of applying the scheme to Scotland. They realize that to evolve a scheme to suit our educational conditions is vastly different from applying a scheme already made. The small number of accepted candidates for examination has already been commented upon in your Council's report. There is no doubt that a much larger number could have successfully passed the gas engineering and gas supply examinations, but unfortunately they lacked the necessary standard in ancillary subjects. The scheme must, however, be taken as a whole, and time will wipe away many of the present difficulties, at least as regards students well placed geographically. If I might be permitted to offer a word of advice to the students conveniently placed to the four Central Institutions, it would be to tell them to give the scheme their whole-hearted support, even if it does not at the moment altogether appeal to them. It may be irksome for some of the older students to go over old ground in order to bring up to the standard the classes they have already taken in a haphazard fashion, but this is necessary before a certificate of any value could be granted. To the younger student the course is straightforward and clearly defined. The Committee of Advice welcome inquiries from any student; and I would urge him before commencing his studies to take more advantage of this Committee, so that he may be assured that the classes he proposes to take fulfil the requirements of the scheme, and thus prevent waste of time and possible loss of temper. To those students not so fortunately placed, my advice is to take up the scheme as far as the available schools can instruct them, in hope that a solution to the present unsatisfactory position may be reached in time to enable them to complete the full course. The Council of your Association have given serious consideration to this question of education in its application to Scotland. They realized that the difficulty is also a financial one. To meet this, proposals were placed before the National Gas Council; and we are glad to know that they have been sympathetically adopted by that body, thus securing financial aid for the better provision of classes throughout Scotland. Rome was not built in a day. We must have patience, but do not let us mistake apathy for patience. It is up to the North British Association to perfect this educational scheme in Scotland and to see that nothing is left undone which would lead to its successful operation.

"New occasions teach new duties; Time makes ancient good uncouth;
They must upward still, and onward, who would keep abreast of Truth;
Lo, before us gleam her campfires! we ourselves must pilgrims be,
Launch our 'Mayflower,' and steer boldly through the desperate winter sea,
Nor attempt the Future's portal with the Past's blood-rusted key."

History of Motherwell Gas.

Perhaps a short sketch of our local history will not be out of place, and some of the records which are available are very surprising when placed alongside those of to-day.

Starting from very humble beginnings, we have gradually grown, and, I hope, developed, with no serious setback even with the advent of electrical competition. I am glad to tell you that our output is still on the increase, though the times we are passing through are not conducive to promoting business of any kind.

The earliest attempt at gas lighting in Motherwell is associated with a communistic adventure known as the "Orbiston Establishment," founded by Robert Owen exactly 100 years ago. Following the Battle of Waterloo a number of enthusiasts thought they could settle all questions of unemployment, and capital and labour problems, by a system of equal division of labour and profits. Operations on a large scale, including the construction of a gas-works, were commenced in 1826, but unfortunately the venture collapsed before the gas-works were completed. Towards the close of 1849 a meeting of the inhabitants of Motherwell was held to consider the advisability of forming a gas company; and the outcome of that meeting was the erection of gas-works on the site of the present works. The plans were prepared by Mr. Bartholomew, Gas Engineer, Glasgow, who is described in the original minute as "the most renowned practical Gas Engineer."

A supply of gas was given in 1850, and the price per meter was fixed at 8s. 6d. per 1000 c.ft. To non-meter consumers, or time burners, the terms were from 6 a.m. to sunrise, and from sunset till 11 p.m. with a charge of 13s. per annum—scarcely a ½d. per day. Then, as now, there was an elasticity about the public conscience, and some of the consumers did not always extinguish the light at the stipulated time. Though the rule for time-burners was rigidly enforced, there was one exception—that of the Motherwell Band, which, when practising, was allowed half-price, revealing that, while there was a keen commercial spirit in the Board of Gas Directors, they were also imbued with a desire to foster the heavenly art of music.

In these early days the major portion of the coal was brought from the Lesmahagow district; and there is still preserved in the Motherwell Gas-Works a relic measuring about 2 ft. square. The first indication of the price of coal in this district is contained in the "Statistical Account of Dalziel Parish," where it is stated that in 1836 the price of coal was 2s. 6d. per ton at the pit-head. One wonders what proportion of this 2s. 6d. was paid to the miner in those days. Touching on coal prices, I find, on looking over our records for the past 45 years, the lowest average price of coal delivered into the works was in the year 1898—the price working out at 7s. 10·25d. per ton.

During 1913 the Motherwell Town Council adopted the Burghs Gas Supply (Scotland) Act; and in June, 1914, the undertaking was transferred from the Gas Company at a purchase price of £136,000. Immediately afterwards a scheme of reconstruction was inaugurated, and a "Wilson-Glasgow" vertical retort bench was erected. You will be interested to hear that these same retorts are still giving in daily service an average of 72 therms per ton of coal carbonized.

Amalgamation.

In 1920 the Motherwell and the Wishaw Town Councils decided to amalgamate. Anticipating this, I was appointed Gas Engineer and Manager to Wishaw prior to the amalgamation, so that I was in the somewhat unique position of acting in that capacity, under two distinct burghs, over two distinct undertakings, at one and the same time.

No records of the old Wishaw Gas Company appear to be extant, but the Wishaw Corporation seems to have been one of the first councils to acquire a gas-works, as the transfer took place within four years after the Burghs Gas Supply Act came into force.

The purchase price was £12,000, and comparison of this figure with that of Motherwell will give some idea of the present-day difficulty of dealing with the finances of these undertakings.

The following table gives the increase in the gas made since 1870:

—	Motherwell.	Wishaw.	Total.
1870	5 millions		
1880	13 ,,		
1890	23 ,,		
1900	78 ,,		
1910	106 ,,		
1914	128 ,,	(Year of transfer to Corporation).	
1920	180 ,,	115 millions	295 millions
1921	201 ,,	134 ,,	335 ,,
1922	219 ,,	131 ,,	350 ,,
1923	206 ,,	148 ,,	354 ,,
1924	223 ,,	133 ,,	356 ,,
1925	262 ,,	117 ,,	379 ,,
1926	276 ,,	118 ,,	394 ,,

After the amalgamation it was decided to join up the two distribution systems. Fortunately, there was a 12-in. main running right from the Wishaw Gas-Works to the late junction of the burghs. The two mains were accordingly coupled up in August, 1923. The fact that the Motherwell Works are situated at a lower level has assisted the supply of gas in the Wishaw area, so avoiding capital expenditure at the latter works. An examination of the previous table will show the effect this has had on the output from each works.

A scheme of centralization whereby the manufacture of gas would eventually be confined to the Motherwell Works is still under consideration by the Gas Committee.

Works Experiences.

I will not weary you with a detailed description of our

works. Much of this has already been given by Mr. Alexander Mackay in his Presidential Address to the Informal Meeting in 1916. The works might best be likened to "Hymns Ancient and Modern," and we are still in the process of weeding out the ancient and replacing with more modern plant. I expect to see our new set of purifiers in course of erection by September; and those of you who saw our old plant of four 20-ft. boxes connected up in such a way that only one box dared be allowed to foul at one time will be interested to hear that 276 millions passed through them last year with only thirteen emptyings during that time, and carried a clean record also for sulphuretted hydrogen.

While our works at Wishaw are well supplied with railway siding facilities, up till now at the Motherwell Works all the material has had to be carted in and out. During the war period the cost of carting became so prohibitive that a steam wagon was purchased to bring down the coal from the station depôt to the coal store. The pendulum has swung back again, and we have found it more economical to revert to the horse and cart. We have now under consideration a railway into the works, and only await a final adjustment with the Railway Company before proceeding with the scheme. I am satisfied that there is a substantial saving to be effected apart from the unavoidable losses that unfortunately accompany the carting of coal or coke. The handling of coal in and out of the store is an integral part of this scheme, and several methods of doing this have been suggested. After due consideration I have come to the conclusion that we cannot better our present arrangement of handling the coal by means of a portable conveyor-elevator which we purchased during the 1921 coal dispute. Its continued use during the present shortage has again brought into focus the mobile handiness and economy of this type of machine for general work in a gas-works.

Some six years ago we had one of our Lancashire boilers fitted with a Crosswaithe furnace. This proved to be so successful that all our boilers at both works are now fitted up in like manner. This furnace has the bars running across the fire and placed so close together that they practically form a rectangular bed-plate traversed by cracks up which the forced draught passes. This draught is supplied through a number of tubular cavities inside the fire-bars proper, and can only escape upwards through the fuel bed, thus avoiding pressure underneath. The fuel is consequently burnt right down to a clinker which is easily removable through the fire door when cleaning. On no occasion has there even been a sign of the clinker sticking on to the fire-bars, which have now become quite polished on the surface. We can so regulate the draught that any grade of fuel can be used to advantage, from good coal or coke down to the smallest of gum or breeze.

About two years ago we had a peculiar experience with regard to a spiral-guided gasholder at Wishaw. The tank had been off the level for some considerable time, and as the tilt had apparently become fixed and permanent, it was decided to level the holder inside the tank. To do this the water was run away. The stand-pipes were flooded as a precautionary measure, and the work of re-levelling was successfully carried out, the holder was refilled with water, the stand-pipes were pumped dry, and the holder was set to work again. In a fortnight the stand-pipes became flooded, and it was found that the joint at the bottom between the pipe and the floor of the tank had blown out. The water had to be run off again, and both joints made good. The holder was again filled with water, and was working for about six weeks when we began to experience difficulty in maintaining the level of the water in the tank. This was found to be due to a leak having developed at some point in the tank bottom, the exact location of which it was impossible to determine. After trying various methods to seal up this leak, it was decided to empty this holder tank again, when we discovered that the millboard joint at one of the jack plates had blown out. Although all the plates had been cemented over, it was found on breaking the cement that every joint could be tightened down. I am satisfied that the emptying of this holder had a perishing effect on the millboard joints, though, possibly, had the holder not been emptied, they might have lasted indefinitely. After such an experience I have lost faith in millboard joints for this work, and have used instead a good-quality jointing cement and best linseed oil. The holder is now working perfectly, and has given no further trouble.

Ammonia Recovery and Lime Purification.

We have been particularly fortunate at Motherwell in obtaining a high yield of ammonium sulphate—frequently over 46 lbs. per ton. We recognize, of course, that this is in some measure due to the heavy steaming necessary to produce a 400 B.Th.U. gas. We are using an old Gillespie type still, and treat the liquor only for the so-called "free" ammonia, as we are satisfied that the recovery of the fixed ammonia would not be remunerative in our case.

At Wishaw the liquor is not worked up into sulphate, being sold crude; but the analysis of the liquor has shown that the yield of ammonium sulphate would be much lower than that at Motherwell—possibly not more than 35 lbs. per ton of coal carbonized. It had been intended to investigate this difference; but owing to the exigencies of the present time, conditions were far from being normal, and we could not arrive at any conclusions which would be of real value.

Analyses of the gas, however, which have been carried out are rather interesting:

—	Hydraulic Main.	Condenser.	Washer.	Scrubber.
Ammonia in grains per 1000 c.ft. at Motherwell	321	85	23	4
Ammonia in grains per 1000 c.ft. at Wishaw	304	53	7	4

Since the coal carbonized at both works is practically identical, and as both are producing the same quality of gas, this difference can only be accounted for by the different types of settings and the carbonizing temperature at Motherwell being lower than at Wishaw.

The Motherwell plant, as already stated, is the Wilson-Glasgow continuous-intermittent type with a flue temperature averaging 1000° C., while the Glover-West continuous system with flue temperature of 1200° C. is at Wishaw. In our opinion these facts account for the wide variation in sulphate yields. The higher temperature and moving charge at Wishaw tend to keep down the formation of ammonia, while the lower flue heats at Motherwell, coupled with the coal charge being at rest unless at the period of partial discharge, tend to promote it.

It has formerly been common practice to value a liquor by its specific gravity or Twaddell, but our tests have shown us the futility of such a method, which, though simple, is certainly not scientific. A few figures in this connection might not be out of place here; and they emphasize the point:

—	A.	B.	C.	D.
Total ammonia, p.ct.	2·08	2·36	1·23	1·26
"Free" ammonia, p.ct.	1·81	2·29	1·14	1·19
Fixed ammonia, p.ct.	0·27	0·07	0·19	0·07
Specific gravity	1·029	1·030	1·024	1·018
Oz. strength	9·9	11·2	5·6	5·9
° Twaddell	6½	6¼	5	4

While on the subject of specific gravity, it is interesting to note from the above that the old rough-and-ready rule "twice the Twaddell equals the oz. strength" is far from accurate. From all the analyses which we carried out, this has not once been obtained. In fact, we find that the factor varies very widely from 0·8 to 1·75; our average being about 1·3.

It is understood, of course, that this rule is only approximate, as the specific gravity depends on the actual composition of the liquor; but it may be a revelation to some of us that the deviations from the recognized rule are so very wide.

A rather interesting experience with regard to purification has arisen at our Wishaw Works, where we use lime. At one time the total number of purifiers requiring to be emptied per year varied from three to six, but of late years this number has materially increased. The most outstanding difference in the working is the admission of very much less air to the gas entering the purifiers than was formerly the practice.

At first, we rather thought that the explanation was merely one of dilution, but a closer study proved to us that this was not so, for when we worked it out to a straight coal gas we still found an increase in lime per million c.ft. passed through. This left us with one other alternative—namely, that some reaction took place as the result of the addition of air whereby the life of the lime was lengthened. Call this revivification if you like. With this end in view, the spent lime was examined for "free" sulphur, with the following result:

	P.Ct.
Moisture	1·50
Total sulphur	21·20
"Free" sulphur	8·37
Tar	1·00

That there should be any deposition of "free" sulphur is perhaps surprising, but the test shows that the admission of air is conducive to the formation of some compound or other which must have purifying properties; and this appears to be more so when the admission of air is carried to the point of dilution which would certainly not be regarded as good practice in gas engineering circles to-day. From observations spread over a period of years, we are of the opinion that any such reaction taking place must of necessity be of a very limited character. It is clear, however, that a judicious admission of air is beneficial to the efficient working of lime purifiers.

Coal Assay.

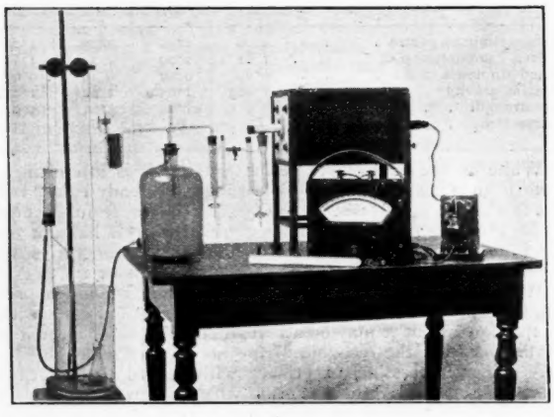
We had been accustomed to testing all our coal in the laboratory by means of the usual proximate analysis. Realizing that something more was required, a coal assay apparatus was installed; and we have obtained some very interesting results from it, having carried out a number of tests of various coals. Even with a completely constructed test plant, ordinary carbonizing conditions cannot be reproduced. A small assay plant takes up little room, with a comparatively small outlay, and, being mainly constructed of glass, affords the advantage that progress can be observed.

The plant itself consists of an electric furnace into which a

silica retort is inserted. A standard thermocouple indicates the temperature of the furnace. To the end of the retort is attached a **U**-tube condenser for the removal of tar and liquor, while in one limb there is a small asbestos plug inserted to prevent, as far as possible, tar passing over to the "scrubber." This latter consists of a **U**-tube, one limb of which is wider than the other. The wide limb is filled with small glass beads, and dilute sulphuric acid is placed in the scrubber to remove the ammonia. The gas then passes on to the "holder," which consists essentially of a glass bottle with a side outlet at the bottom. As the gas enters the holder at the top, the water flows from the bottom into the glass reservoir through an overflow which is suspended over a pulley and balanced by means of a float on the water in this reservoir which is of the same diameter as the holder. By adjusting the height of the overflow, we can arrange to have a "pull," "pressure," or "level gauge" in the holder, as measured by a small **U**-tube gauge at the top.

The photograph which I have taken shows the complete plant as it is when at work.

When we adopted this apparatus for testing our coals we found that, if comparative results were to be obtained, we had to standardize the method carefully. When, therefore, we are testing a coal, the bulk is carefully sampled, following the usual routine of coning, quartering, and grinding, until the required amount is obtained. Ten grammes of this sample are now carbonized, the retort being inserted into the furnace at 300° C. The temperature is allowed to rise at approximately 20° C. to 30° C. per minute until 900° C. is reached, and is maintained at this till the quantity of gas given off is negligible.



Coal Assay Apparatus.

The gas, tar, liquor, and coke are then examined, and estimated as yields per ton. The amount of tar is very small; and to obtain the gallonage, an average specific gravity is adopted. No great stress, however, is placed on the tar results. The condensed liquor from the "condenser," after separation from the tar, is mixed with the acid liquor from the "scrubber," and is distilled for ammonia in the usual way. The result is calculated to a yield of ammonium sulphate per ton. The gas is analyzed, and the calorific value is then calculated, to give the yield of therms per ton. The following figures, which have been found to be most suitable from C.V. determination and analyses, are adopted:

Unsaturated hydrocarbons	2660	B.Th.U. per c.ft.
Carbon monoxide	325	" " "
Methane	1024	" " "
Hydrogen	342	" " "

The results obtained give us good comparative tests as to the value of the coal.

The average results of these assays are as follows:

Gas	8690 c.ft. per ton, giving 50·22 therms per ton	
Coke	11·41 cwt.	"
Tar	17·18 galls.	"
Sulphate	21·52 lbs.	"

From these figures and our ordinary carbonizing results we have worked-out factors so that from a test of any coal which has been properly sampled we can predict within a reasonable margin the expected yields under our conditions of carbonization. Up to the present this has operated satisfactorily, indicating to us which coals yield good or bad cokes with or without the ever-elusive therm. The test also tells us the most easily carbonizable coal, for we find that some coals give off their gas in about 40 minutes, while others require as much as 50 minutes, these latter being the exception.

We find that the first gas is given off at a temperature which averages 470° C., and the aqueous distillate and tar come over from 420° to 675° C. A consideration of the variations in these temperatures and the length of time we must maintain 900° C. lets us know if any variation in the method of working will be necessary. In short, we get a fair idea of the results a coal will yield, along with the suitability and ease with which it can be worked.

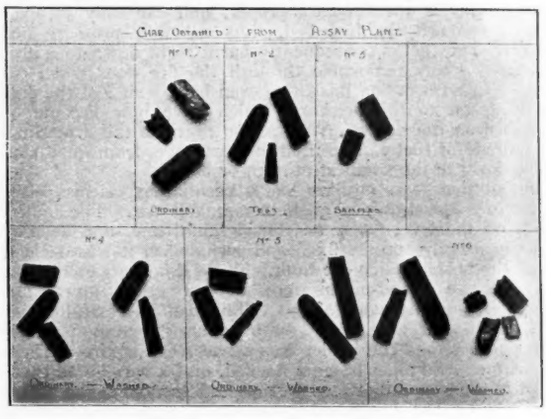
PROXIMATE ANALYSIS DISCUSSED.

Results of numerous tests have impressed upon us the inadvisability of judging a coal from a proximate analysis only, since we have found that a high percentage volatile does not necessarily presage a high thermal yield; some coals giving a gas with a calorific value over 600 B.Th.U. per c.ft., while others give as low as 500 B.Th.U. per c.ft. In fact, they almost seem to indicate that one might just as well judge them from the point of view of ash content, as high ash means small coal substance, and consequently little gas.

We find also that, though the proximate analysis may give a comparative test under specified conditions, it does not always give the total volatile which might be obtained. As an indication of this, we have only to compare the percentage organic volatile as recorded by the proximate analysis with the results of the assays where carbonization is carried to completion, as follows:

Time to Carbonize 10 Grms. in Mins.	Organic Volatile. By Assay.	Organic Volatile. By Analysis.	Difference.
	P.Ct.	P.Ct.	P.Ct.
40	34·86	31·83	3·03
45	30·35	26·65	3·7
50	34·25	29·60	4·65

That is to say, if works conditions were always fixed as the proximate analysis, with its standard conditions of a 20 cm. flame and crucible 7 cm. from top of burner with a 7 minutes' test, &c., the results would probably be in the ratio of the proximate analysis. But, as we have seen, some coals take longer to give up their volatiles than others, and some give off a richer gas. Consequently, one has always the fear that in the proximate analysis some volatile may have been recorded as coke. This would suggest that a longer time would make for more complete and accurate results, but we must be very careful that we do not produce conditions which might to the slightest extent ash the coke produced. From all considerations as to a test for coals to be worked in a gas-works, I am driven to the conclusion that, though the proximate analysis may be satisfactory from some points of view, it is of little practical value in determining what a coal will yield, and how it can best be worked. The assay plant which I have described seems to me to meet this want.



Char from the Assay Plant.

These tests have led us on to carry out a number of experiments which have brought to light some rather important points. I hope it will not be uninteresting if I briefly summarize them here.

One such series of experiments which we have made was an assay of the coal as received, with the results as stated. A similar sample was then taken, cleaned, and washed, and the assay carried out as before. For these tests the corresponding average results are as follows:

—	Ordinary Sample.	Washed Samples.
	P.Ct.	P.Ct.
Proximate Analysis—		
Moisture	6·47	7·79
Organic volatile.	30·11	32·29
Fixed carbon	55·82	57·52
Ash	7·60	2·40
Assay—		
Therms per ton.	50·5	53·1
Coke yield per ton (cwt.)	11·84	11·59
Tar per ton (galls.).	20·7	21·6
Sulphate per ton (lbs.)	20·4	26·79

The assays bring out a distinct improvement in thermal yield in the washed sample, amounting to, on an average, 3·5 therms

per ton, calculated to a working result. The coal in general showed a greater coking tendency. In the case of the stronger coking coals, the removal of foreign matter seemed to make it more swollen and friable; but where a coke was previously powdery, washing the coal greatly improved it, making it harder and less liable to abrasion. In general it was greatly improved.

At the same time it was evident that the washed sample was more easily carbonized than the ordinary sample—the bulk of the gas being given off at a lower temperature, as will be seen later. This, then, brings us to the point that proper washing and picking would produce a coal which would give a better thermal yield and would at the same time produce a

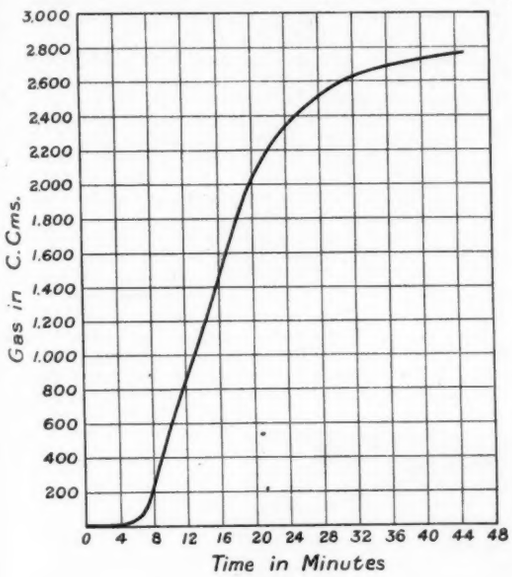


Fig. 1.

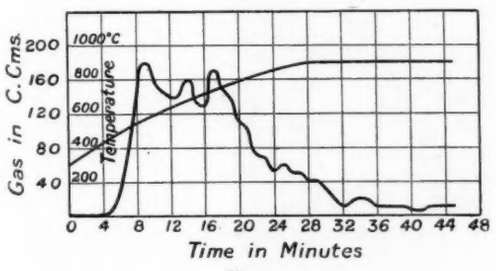


Fig. 2.

coke more easily handled, and with lower ash, thus reducing clinkering troubles both for ourselves and for others. The saving, too, in transport might stagger us if we worked out what 5 p.ct. means over a year's working. This might with advantage be an integral part of the proposed scheme of reorganization in the mining industry.

We then carried out a series of experiments observing the gas given off per minute with the corresponding carbonizing temperature. From these experiments we found that the coals showed a number of decomposition points. In the majority of coals these points numbered three, but in several cases there was a fourth point at a slightly lower temperature.

The temperatures at which decomposition took place, as judged by the amount of gas given off, were about 590° C., 670° C., and 730° C.; and when a fourth temperature was observed, it was in the neighbourhood of 540° C.

When a sample of coal was washed and picked as described above, it was found that these temperatures were slightly lowered, being respectively 550° C., 660° C., and 725° C.; while the fourth one was approximately 500° C. We suggest that this is in some measure due to the reduction in ash content; less heat being absorbed by the ash.

At temperatures above this last decomposition point the quantity of gas given off was gradually decreased, with at times an occasional small flush of gas; but the variation was very little. The two graphs show how the gas is given off—the first one being the total gas by minute observations, and the second the gas given off per minute. Plotted on the same graph are the corresponding temperatures.

The latter graph indicates the decomposition points described; and we find that the quantities of gas given off at these points vary somewhat. Thus with some coals most of the gas is given off during the first flush, while with others it is at the second or third flush, giving us yet another indication of how the gas will come off. It might be stated here that generally the first flush is the one which gives off most of the gas, as shown in this graph.

We have compiled the following table, which, I think, will give you some idea of the range of coals used by us, and at the same time bring out the value of the analyses, along with the discrepancies of the proximate analysis:

—	A.	B.	C.	D.
	P.Ct.	P.Ct.	P.Ct.	P.Ct.
Proximate Analysis—				
Organic volatile (moisture free)	27·52	32·91	34·87	36·36
Fixed carbon	66·66	61·14	59·01	56·29
Ash	5·82	5·85	6·12	7·35
Assay—(Calculated to works results)—				
Therms per ton	68·25	68·7	70·14	66·7
Coke yield per ton (cwt.)	14·4	12·8	12·9	12·4
Tar per ton (galls.)	19·7	20·5	13·5	25·8
Sulphate per ton (lbs.)	51	52½	27½	45
Duration	40 mins.	50 mins.	40 mins.	45 mins.
Coke	Hard, dull	Slightly powdery	Good, hard	Bright, friable

It had been our intention to continue experiments, but the stern realities of procuring and distilling coal in bulk forced everything into the background. I do not intend to refer in this address to the use of foreign coal, though experience in this connection must, I feel sure, be of an exceedingly varied and interesting character. I have already tried your patience more than enough, and in any case it might be better to delay raising this subject till a more convenient season—time, they say, being a wonderful healer. Meantime it is our duty, each in his own sphere and his own way, to keep flying at the masthead the flag of constant endeavour. Above all let us continue to keep faith with the general body of consumers who are becoming more and more dependent upon us for light, heat, and power. Let us be untiring in our labours, sowing the seed from which others may yet reap the harvest of clearer skies, healthier homes, and a more contented community.

"No easy hopes or lies
Shall bring us to our goal,
But Iron Sacrifice
Of body, will, and soul."

Institution of Mining Engineers.—The summer meeting of the institution, originally fixed to be held at Newcastle-upon-Tyne in June last, and postponed to a date in the autumn, will not be held, owing to the continuing stoppage in the coal industry.

Low-Temperature Tar Oils.—In a paper prepared for the Division of Gas and Fuel Chemistry of the American Chemical Society, S. P. Burke and S. Caplan discuss the cause of the red colour of aqueous extracts and emulsions of low-temperature tar oils. In this it is stated that the production and marketing of low-temperature tar are handicapped by the fact that the tar liquor, and also disinfectant emulsions made from the tar oils, are coloured strongly red. The exact cause of this red colouration has been unknown. It has now been found that the material in the tar which gives rise to the red colour can be completely and selectively extracted by means of an aqueous solution of borax. The material thus extracted has been examined by physical and chemical means, and found to consist of a large number of ortho-dihydric phenols, ranging from homologues of catechol to ortho-dihydroxy derivatives of naphthalene homologues.

Ice from a Gas Flame.—A remarkably ingenious refrigerator has been invented, which needs only the lighting of a very small gas burner to set it in action. In a comparatively short time the interior of the refrigerator becomes so cold that it will preserve meat, game, and fish, set jellies, cool champagne, cocktails, and other drinks, turn water into ice, and make easy the provision of home-made ice cream. All this can be done at a cost of only a penny for gas for every seven hours during which the refrigerator is in use. It is explained in an attractive issue (No. 150) of "A Thousand-and-One Uses for Gas."

Manchester College of Technology.—We have to acknowledge the receipt of Vol. 12 of the "Journal" of the Municipal College of Technology, Manchester. There has been a long interval since the publication of the previous volume; but (according to a prefatory note) "normal conditions having been once again reached," it has been found possible to continue the publication, with its former characteristics. The present issue contains several original scientific articles by members of the College staff, as well as abstracts of papers published by them elsewhere—the record of the investigations carried out in the College being thus brought to the close of 1924.

EXPERIENCE OF A MANUAL RETORT-CHARGING MACHINE.

By HAROLD ROBINSON, of Annan.

[Paper before the North British Gas Managers' Association.]

Though many valuable and instructive papers have been given from time to time by members of the Association on the subject of gas manufacture and its commercial policies, and it might be assumed that these matters of discussion had been worn threadbare, yet it is pleasing to note the keen interest that is taken when any fresh opinion or experience is given on some subject of everyday practice. Bearing this in mind, therefore, I propose to put before you my experience with a manual retort-charging machine, trusting that this subject may find some appreciation from those of my fellow managers whose manufacturing conditions approximate to my own.

The aim and desire of all in charge of gas undertakings—no matter the size—is to endeavour to cut down the costs of manufacture without restricting efficiency. It has been said that without vision the people would perish; and the gas manager must have his share of vision if the works under his control are to prosper. He must not allow himself to be snowed-under by routine work.

A most important point, then, is to economize the manager's time; not, however, with a view to giving him an easier time, but in order that he may have freedom to devote his mind and energies to other important branches of the service. He must so organize his duties that he has time to give his attention to creating new markets and extending his existing markets for his product—namely, gas. It is not sufficient for a manager to be a good engineer and a keen buyer of coal. These qualities are essentials. He must, in addition, be a man of enterprise.

In the retort house, where much money can be wasted or made, the manager must either keep a very close grip of the work, thereby taking up too much of his time, or, alternatively, he must so organize the work that good results can be obtained without his personal supervision. The type of retort house to which I am referring is one fitted with horizontal retorts for the production of straight coal gas.

I do not propose to take up your time in discussing the relative merits of water gas plants, vertical retorts, or plants for complete gasification. I will confine myself to plant making gas with horizontal retorts about 10 ft. long. In a retort house of this class the charging is usually done by shovel; and though many managers get excellent results, it must, I think, be admitted that they are only attained by the constant supervision and assistance of the manager himself.

Stokers must have many virtues; and as there are so many human elements involved in their maintaining a high standard of stoking, the manager is compelled to devote more time than he can, or ought to, afford to this branch of the work. After all, there are only 24 hours in the gas manager's day; and it must be borne in mind that, in addition to stoking, he has to attend to a large number of other duties.

This state of affairs has caused managers from time to time to study other possible methods of stoking. The beautiful and elaborate plants possessed by managers of larger works are, because of the capital charges involved, beyond the reach of those works where perhaps only one hand stoker per shift is required, except during the busiest part of the year; and any plant adopted must of necessity be capable of being operated by one man, and be a profitable investment.

In my own case, with the increased consumption of 12 million c.ft. over the past five years, I found that the retort capacity was getting too near the margin of safety, and that the conditions of working would require to be altered if an extension of the retort house, or the provision of other auxiliary gas producing plant, was to be avoided; otherwise there would be a danger of being unable to maintain supplies of gas during periods of heavy demand. To have extended the retort house would have involved a much higher expenditure that my Company were prepared to sanction; and, in looking round for a remedy, my attention was drawn to the mechanical charging machine made by Messrs. H. Morris, Ltd., of Loughborough.

It was reputed to be a one-man machine claiming to put in a good charge, and to stand up well to its work; and, after making inquiries and examining the machine in use at various works, I decided to recommend my Directors to purchase. It was erected last October, brought into action early in November, and has been in constant use since. I consider that it does all that the makers claim for it. It is actually a one-man machine—in fact, a well-grown youth can work it—and the charge is evenly and loosely laid.

The construction of the machine is worthy of attention. It consists primarily of a double scoop, formed of two steel tubes ¾ in. thick, into which the charge is shovelled. While this is being done, the scoop is close to the floor level.

The scoop is carried at its rear end by a standard supported at the top by a travelling carriage, and at the bottom on rollers which run on rails for the full length of the retort house. After being filled, the scoop is hoisted to the height of the retort about to be charged, and is then swung round, as shown in fig. 1, until the front of the scoop is in line with the retort. It should be mentioned that the dead weight of the scoop is balanced so that only the weight of the charge itself has to be raised. The next operation is to propel the charged scoop into the retort, for the whole of its length, as shown in fig 2.

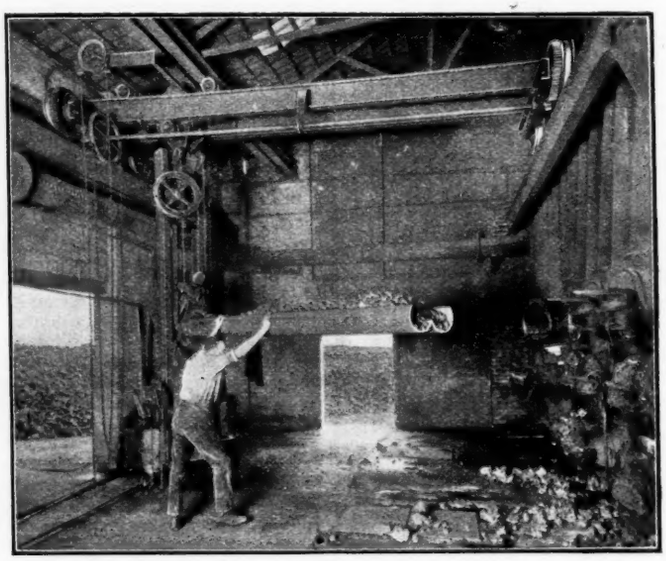


FIG. 1.

The charge is now lying in the scoop, in the retort, as shown in the top sectional view in fig. 3. The operator next turns the pilot wheel at the rear end of the scoop, to which the two half sections are geared, causing the halves to revolve on their axes and to deposit the coal in the retort, as shown on middle part of fig. 3. Finally the scoop is withdrawn (see bottom part of fig. 3) leaving the charge equally distributed along the bottom of the retort.

The charger is well and strongly made, all the motions of travelling, traversing, and scoop discharging have large diameter roller bearings, and the ease and speed with which the various operations are performed are surprising. The whole operation—from the time the point of the scoop enters the mouthpiece, until it is withdrawn, leaving the charge in the retort—is completed in less than one minute. In the construction of the machine all the movements are on shafts of ample diameter, the gear wheels are machine cut, and the running is perfectly easy.

Like any other piece of machinery, the charger requires to be properly looked after, and to have periodical cleaning and oiling; but, though the work is severe, it shows no appreciable signs of wear.

The advantages of the machine are many and cumulative.

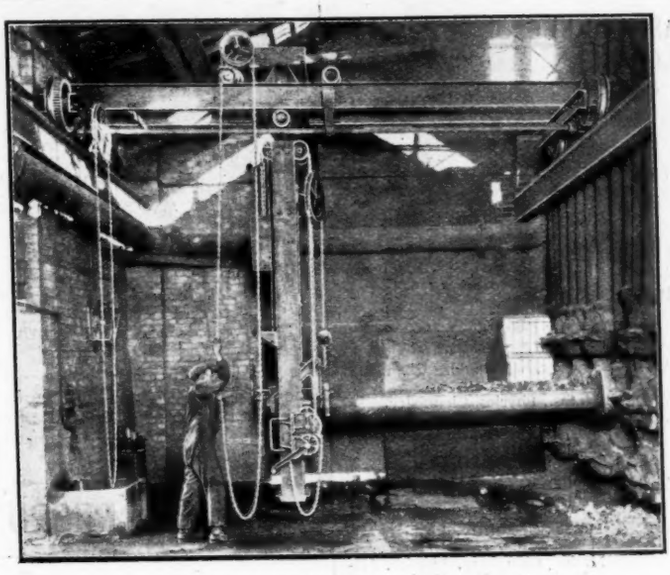


FIG. 2.

There is a better yield of gas, due to the charging being accomplished quickly and without packing; and this is specially noticeable when strong caking coal is being used. A mechanical uniformity as regards the weight put in, the even and loose distribution of the coal, comparing one shift with another, and the easier drawing of the charges, all tend to produce less wear and tear on the retort itself.

Entering

Dumping

Withdrawing

Fig. 3.

The actual yield of gas per ton when using the charger varies. Some works have claimed big increases, but, in my opinion, the machine plays a more important part than merely increasing the make per ton. It gives an increased output of gas per man, and also a larger make per mouthpiece.

During the periods under review, the class of coal used was practically the same. The records are taken from the carbonizing book, and cover from Nov. 1, 1925, when the machine was first put into service, to June 30, 1926, inclusive, as against the corresponding period of 1924-25, when hand charging was in use.

The following figures show what we have been doing:

In 1924-25, with hand charging, the number of retorts charged was 14,777, and the gas produced 22,826,000 c.ft.

In 1925-26, when the machine was in operation, the number of retorts charged was 11,763, and the gas produced 24,880,000 c.ft. This gives a decrease in the number of retorts charged of 3014, and an increase in the production of gas of 2,054,000 c.ft., which is equivalent to 20 p.ct. less charges, and 9 p.ct. increase in make.

I will now deal with my statement, from which it will be observed that the increased make per man is 8050 c.ft. per shift, and the increase per mouthpiece 530 c.ft., giving a resultant saving of approximately £630 in the year.

1924-25 *Without Machine.*

Number of retorts charged	14,777
Gas manufactured	22,826,000 c.ft.
Over the period of 242 days	94,322 c.ft. per day
An average of 4 men stoking	23,580 ,, ,, man
15 retorts per shift	1,572 ,, ,, mouthpiece
Coal carbonized	2,088 tons
Average per ton	10,931 c.ft.
Average calorific value	500 B.Th.U.

1925-26 *With the Machine.*

Number of retorts charged	11,763
Gas manufactured	24,880,000 c.ft.
Over the period of 242 days	102,800 ,, per day
An average of 3¼ men stoking	31,631 ,, ,, man
15 retorts per shift	2,109 ,, ,, mouthpiece
Coal carbonized	2,084 tons
Average per ton	11,938 c.ft.
Average calorific value	500 B.Th.U.

SUMMARY.

	Gas made per Man.	Per Mouthpiece.
1924-25	23,580 c.ft.	1,572 c.ft.
1925-26	31,631 ,,	2,109 ,,
Increase	8,051 ,, per man, and	537 ,, per mouthpiece

An approximate increase of 33⅓ p.ct., representing an annual gain of £630, arrived at as follows;

1924–25.

	£	s.	d.
Cost of 4 men at 8s. 10d. per shift	427	10	8
2088 tons of coal at 25s. a ton	2610	0	0
	£3037	10	8
To produce 22,826,000 c.ft. at 3s. 8d. per 1000 c.ft.	4184	15	0
Making gross gain	£1147	4	4

1925–26.

	£	s.	d.
3¼ men at 8s. 10d. per shift	347	7	5
2084 tons of coal at 25s. a ton	2605	10	0
10 p.ct. depreciation on charging machine	42	0	0
	£2994	17	5
To produce 24,880,000 c.ft. at 3s. 8d.	4562	6	8
Making gross gain	£1567	9	3

showing an increase of gross profit on 242 days' working of £420 4s. 11d., or an approximate yearly gain of £630.

GOLF MEETING.

The North British Association of Gas Managers' Golf Circle held their annual competition over the Killermont Links (by kind permission of the Glasgow Golf Club) on Wednesday, Sept. 1. The results were as follows:

Challenge Bowl	J. I. Scott (Glasgow)	
2nd Prize	John Lang (Alexandria)	Tied
3rd Prize	D. M. Munro (Glasgow)	Tied
4th Prize	James Bell (Dumbarton)	Tied
5th Prize	Frank Richmond (London)	Tied
Scratch Prize	J. I. Scott, with 71	

At the general meeting, Bailie Archibald Hamilton, of Glasgow, was elected Golf President for the coming year. He has promised to present to the winner a replica of the Challenge Bowl.

Safety in Mines Research Board.—In examining the problem of coal-dust explosions, the most important factors, with respect to both the ignition of coal dust and the propagation of flame in a dust cloud, are the degree of fineness, the shape, and the distribution of the particles of dust in the cloud; and the particular physical quality involved is the specific surface of the dust—*i.e.*, the ratio of surface to mass in the particles of the dust. The merits of the several methods which can be used for determining the specific surfaces of dusts are discussed in a paper by E. F. Greig entitled "Some problems connected with the determination of the fineness of coal dust" (Safety in Mines Research Board Paper No. 25; H.M. Stationery Office, Adastral House, Kingsway, W.C. 2, price 1s. net).

INSTITUTION OF GAS ENGINEERS' EDUCATION SCHEME.

First List of Successful Internal Candidates in the 1926 Examinations.

From Mr. Walter Hole (the Organizing Secretary) we have received the following list of successes in the May examinations for Internal Students of gas engineering and gas supply under the Institution of Gas Engineers' Education Scheme. The list of passes by external candidates was given on p. 253 of the "JOURNAL" for Aug. 4.

BATH TECHNICAL COLLEGE.

GAS ENGINEERING—ORDINARY GRADE.

Name.	Class.	Ancillary Subjects.
Ashman, W. L.	1st W.D.*	Physics, Organic Chemistry, Maths.
Feltham, H. C.	1st W.D.*	Maths., Physics, Chemistry.
Borrett, V. J.	2nd	Maths., Physics, Chemistry.
Parriss, R.	2nd	Maths., Physics, Chemistry.
Wardle, N. F. D.	2nd	Maths., Physics, Chemistry.

BIRMINGHAM MUNICIPAL TECHNICAL SCHOOL.

GAS ENGINEERING—ORDINARY GRADE.

Downing, J.	1st	Maths., Chemistry, Physics, Mechanics, and Heat Engines.
Turner, C. R. E.	2nd	Maths., Chemistry, Physics, Mechanics, and Heat Engines.

GAS ENGINEERING—HIGHER GRADE.

Sylvester, F. C.	1st W.D.*	Applied Mechanics and Heat Engines, Applied Mechanics for Builders, Electrical Engineering.
Taylor, J. R.	1st	Maths., Physics, Machine Drawing, Applied Mechanics and Heat Engines, Electrical Engineering.

GAS SUPPLY—ORDINARY GRADE.

Clarke, W. H.	1st	Organic Chemistry (Lect. and Lab.), Physics (Lect. and Lab.).
Harvey, T. A.	1st	Applied Mechanics for Builders, Machine Drawing, Electrical Engineering.

BRADFORD TECHNICAL COLLEGE.

GAS ENGINEERING—HIGHER GRADE.

Barwick, J. C.	1st	Maths., Building Construction, Heat Engines, Strength of Materials.
Cowley, L. R.	2nd	Maths., Heat Engines, Strength of Materials, Building Construction.

GLASGOW ROYAL TECHNICAL COLLEGE.

GAS ENGINEERING—ORDINARY GRADE.

Lorimer, H.	1st	B.Sc. in Applied Chemistry.
Currie, W. A.	1st	Maths., Chemistry, Physics, Dynamics.

GAS ENGINEERING—HIGHER GRADE.

Anderson, A. R.	2nd	Maths., Chemistry, Physics, Heat Engines, Dynamics, Engineering Drawing.
Greig, J. C.	2nd	Maths., Chemistry, Physics, Dynamics, Electricity and Magnetism, Motive Power Engineering.
McGown, S.	2nd	Maths., Chemistry, Physics, Fuels, Mechanics.

GAS SUPPLY—ORDINARY GRADE.

McDonald, A.	1st W.D.*	B.Sc. in Applied Chemistry.
Macfarlane, A. A.	1st W.D.*	Maths., Chemistry, Physics, Dynamics.

LIVERPOOL MUNICIPAL TECHNICAL SCHOOL.

GAS ENGINEERING—ORDINARY GRADE.

Allerton, H.	2nd	Inorganic Chemistry, Organic Chemistry, Chemistry of Fuels.
Lamb, J. E.	2nd	Inorganic Chemistry, Organic Chemistry, Physics, Chemistry of Fuels.

MANCHESTER COLLEGE OF TECHNOLOGY.

GAS ENGINEERING—ORDINARY GRADE.

Williams, E.	1st	Maths., Physics, Inorganic Chemistry, Organic Chemistry, Chemistry of Non-Metals, Chemistry of Metals.
Law, J. E.	2nd	Inorganic Chemistry, Organic Chemistry, Chemistry of Metals.
Smith, J. P.	2nd	Inorganic Chemistry, Organic Chemistry, Chemistry of Metals.

GAS ENGINEERING—HIGHER GRADE.

Gallagher, P.	2nd	Mechanics, Building Construction, Gas Engineering Calculations, Chemistry of Gas Manufacture.
Smith, W. P.	2nd	Costing and Estimating, Chemistry of Gas Manufacture.
Shadbolt, J. H.	2nd	Mechanics, Building Construction, Gas Engineering Calculations, Chemistry of Gas Manufacture.

GAS SUPPLY—ORDINARY GRADE.

Freshney, C. E. M.	2nd	Covered by Associateship Manchester College of Technology in General Chemical Technology.
Haslam, G.	2nd	Mechanics, Building Construction, Gas Engineering Calculations.

SALFORD ROYAL TECHNICAL COLLEGE.

GAS ENGINEERING—ORDINARY GRADE.

Pope, J. G.	2nd	Maths., Physics, Inorganic Chemistry, Organic Chemistry, Machine Construction and Drawing.
Walsh, J. B.	2nd	Physics, Inorganic Chemistry, Organic Chemistry, Chemical Analysis.

* W.D. = With distinction.

The results obtained by the candidates sitting at Burnley, Huddersfield, Leeds, the Regent Street Polytechnic, and the Westminster Technical Institute are to follow, and will be published as soon as possible after the results in the examinations in ancillary subjects have been confirmed by the Board of Education.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Three-Part Gas Rates.

SIR,—With reference to my article in the "JOURNAL" of Sept. 1 (p. 471), please note that there is an arithmetical slip.

In town "A" the increase of demand from 30 c.ft. per hour to 80 c.ft. per hour involves an addition of £3 6s. 8d. per annum, not £3 16s. 8d. Consequent on this, the percentage increase (customer and demand together) is nearly 90 p.ct., instead of nearly 100 p.ct.

Nothing in the context needs alteration on account of this.

GEO. EVETTS.

Palace Chambers, Bridge Street,
Westminster, S.W. 1,
Sept. 4, 1926.

"Gas" or "Gas Fired?"

An appeal for a better utilization of the word "gas" in connection with the literature of the industry is advanced by Mr. Eugene D. Milener (of the Consolidated Gas, Electric Light, and Power Company of Baltimore) in the pages of the "Gas Age-Record." He asks whether we are getting the most out of the word "gas," and goes on to say: An industry the size of ours issues millions of pamphlets, booklets, circulars, and catalogues every year, and from a study of representative samples I am convinced that we, as an industry, are overlooking a valuable opportunity to drive home the magic word on which our prosperity depends. . . . There seems to be some difference of opinion in describing gas appliances whether to use the words "gas" or "gas fired." In my opinion, the word "fired" detracts from the force of the description. Repeat the words "gas furnace" and "gas fired furnace," and you will see that the word "gas" is drowned in the latter case. The word "fired" receives the emphasis. How much more impressive it is to say "gas furnace," "gas oven," or "gas forge." I regard it as a sign of weakness to call upon another word to help "gas" in describing an appliance; but if one feels the need of help, let him use a word descriptive of what gas *does*, such as "heated," instead of "fired," which describes a disagreeable duty that gas eliminates.

Accrington Coal Supplies and Gas Price.—Sufficient American coal has been purchased by the Accrington District Gas Board to carry them along to the middle of October. The estimated additional cost to the Board of this is £15,000; and to meet this the Board have decided to increase the price of gas by practically 10 p.ct., as from the reading of the meters for the September quarter.

Cork Gas Consumers' Company.—The accounts of the Company for the twelve months ended June 30 show an increase in rental, which has been mainly due to the greater use of gas for heating and cooking purposes. After placing £1600 to the credit of the depreciation fund, the balance of profit and loss is £5278; and the payment of a dividend at the usual rate of 8 p.ct. per annum will leave £600 to be added to the reserve fund.

Results at Fleetwood.—At the half-yearly meeting of the Fleetwood Gas Company, the Chairman moved the payment of 7½ p.ct. preference and 6 p.ct. ordinary dividends. Through the coal dispute, he said, the Directors had experienced difficulty in maintaining supplies, but they had succeeded in doing so. At the beginning of the strike they carried stocks of coal sufficient for 10 to 12 weeks' supply of gas. This was exhausted a month ago. Fortunately, long before their stock was depleted the Directors made arrangements for the importation of American gas coal. This importation had cost 2½ times per ton more than the pre-strike cost of the British coal. In the present half-year, the whole of the coal used was imported, and gas was being manufactured at a loss. They were compelled temporarily to increase the price of gas by 5½d. per 1000 c.ft. after the end of the present quarter. The increase in local sales was being maintained, and the demand for appliances augured well for the future. The Directors' report showed a gross profit for the half-year to June 30 of £2014, reduced in profit and loss account by loan interest to £1564.

MISCELLANEOUS NEWS.

DIFFERENTIAL CHARGES FOR GAS.

Interim Report—Terms of Reference Enlarged.

[Published by Permission.]

The following interim report of the Committee of the National Gas Council who have been considering the above question was submitted to the Central Executive Board at their meeting on July 13. The Committee were asked to continue their labours, and the terms of reference were enlarged so as to embrace consideration of methods of charging for gas other than the present flat-rate system.

DIFFERENTIAL CHARGES.

To the Chairman and Members of the Central Executive Board of the National Gas Council.

The Committee appointed by the Board on July 14, 1925, have been faced with a responsible task, and there has been delay owing to attention having to be given to other urgent and important matters, so that it is considered advisable to submit this interim (agreed) report.

The members of the Committee are: Messrs. R. B. Anderson, F. J. Bradfield, C. F. Botley, H. E. Ibbs, P. N. Langford, W. B. McLusky, T. P. Ridley, A. W. Smith, E. Upton, G. Evetts, and F. W. Goodenough, the last three named co-opted. Valuable assistance has also been afforded by Mr. E. J. Fottrell and Mr. W. J. Smith.

The terms of reference—viz.:

> "To consider the question of differential prices for gas—viz., discounts for gas supplied in large quantities or for special uses such as power purposes—and whether the dividends of sliding-scale companies might properly be calculated upon the average price received for gas,"

were found not to be wide enough to embrace the diversity of the subject, and the Committee have felt that they would be doing as was desired by extending the scope of their inquiry.

A Sub-Committee was set up, consisting of Messrs. Bradfield, Evetts, and Ibbs, to go into the question of the financial factors which should be taken into consideration in devising some scientific tariff; and their report has proved of very great value.

The subject of differential charges is one of extreme perplexity and difficulty, and the Committee are not yet in a position to give definite recommendations on any particular new system of charging, as much more detailed information must first be collected and studied.

The flat-rate system of charging for gas is so simple and is in such general use (in some cases with discounts dependent upon the purposes for which the gas is used or upon the total quantity consumed), that many in this country have accepted the position that no other system is possible or advisable.

The flat-rate system has become unsatisfactory in its working, as there are many costs which are the same for a small consumer as for a large consumer, and there are great differences in the quantities of gas required at various periods of the year and day. The present system does not give the flexibility now required in competing with other kinds of fuel.

There are, in fact, systems other than the flat rate in use in the United Kingdom designed to avoid the restrictions referred to—such as the alternative system in use at Halifax. In the electrical industry of this country many systems are in vogue, and a Committee set up by the Electricity Commissioners are at present studying the matter further. The fact that the electrical industry has many methods of charge forms no criterion, however, for advocating the adoption of any of them by the gas industry, owing to differences in conditions surrounding the two methods of production.

In America, although it is important to realize that the conditions are not analogous with those in this country, many systems, both for gas and electricity, are in use, designed to give flexibility in meeting competition and in encouraging consumption.

There are block, two-part, three-part, and four-part systems in operation. These systems may be briefly described as follows:

Block System.—A certain price per 1000 c.ft. or per therm for a certain quantity of gas per month, quarter, or year, termed the primary rate, and a lower price for the remainder termed the secondary rate. In some cases this remainder is divided up, and a third rate (lower than the second) is introduced.

Two-Part System.—A rate which includes a substantial sum to cover the costs incurred by the undertaking in placing itself in a position to supply if called upon to do so. This sum is payable whether any gas is used or not. The actual consumption is charged at a low rate, and in many cases under the "block" system.

Three-Part System.—The rate is made up of—

(*a*) Customer charge.
(*b*) Demand charge.
(*c*) Commodity cost.

The following definitions have been employed by the Kansas Public Service Commission for these costs:

(*a*) "The 'customer charge' consists of the expense of bookkeeping, billing, collecting, setting, removing, and repairing meters, gratuitous complaint service, office rents, meter reading, and other expenses, and a part of the fixed charges of the physical property. The aggregate of these various customer expenses will be identical for all customers regardless of whether they use gas in small or large amounts, or no gas at all. The 'customer charge' has often been incorrectly referred to as the expense of reading the meter, but this is only one minor item."

(*b*) "A 'demand charge' consists of that part of *company* expense incidental to providing and maintaining the production, transmission, and distribution system of sufficient capacity to render service as required.

"The principal elements in this cost are the fixed charges, among which are interest, taxes, and depreciation on the necessary plant, and part of the operating and maintenance expense of the physical property. The 'demand charge' is distributed among the customers in proportion to the demand which is contracted for by each customer, and hence in the proportion which each customer contributes towards the creating of the total demand expense."

(*c*) "The 'commodity cost' consists of the items of material and labour, and expenses and repairs, directly entering into the production of gas, which are directly proportionate to the volume produced."

Four-Part System.—The rate is made up of—

(*a*) Customer charge.
(*b*) Manufacturing demand charge.
(*c*) Distribution demand charge.
(*d*) Commodity cost.

In the two-part rate, (*a*), (*b*), and (*c*) are coupled together.

The block system is generally applied to domestic consumption, and one of the other systems (usually the three-part system) to industrial consumption.

The Committee are agreed upon certain matters of general principle which should be applied to any system of charge.

To enable any undertaking to arrive at the maximum allowance which might be economically made for any special consumer, it would be necessary carefully to dissect the whole of the charges in the various items of expenditure between those which are divisible equally "per consumer," those which are applicable to every thousand cubic feet or therm, and those which are dependent upon the maximum demand. This dissection will vary with individual undertakings.

Only in very rare circumstances should the total charge to any gas consumer be less than sufficient to cover the cost of gas into gasholder and to provide the full quota of capital and other standing charges connected with the particular supply affected. Should the loss of an existing consumer or the acquisition of a new consumer so affect the efficiency of production either in carbonizing results or wages costs as to alter the cost into gasholder, this should be taken into consideration.

Special bulk consumers, or even special groups of consumers, may require the price of gas fixed as a result of policy rather than by a scientific calculation of costs of production; but in this connection regard must be had to the immediately preceding paragraph. There is no justification for discrimination between the use to which gas is put unless the nature of the requirement in relation to maximum demand and time of consumption affects the cost of supply.

In very rare circumstances only should a prospective consumer be given a special advantage in the cost of supply in respect of the capital already expended or of the benefits of the existing organization. There must come a time when further expenditure is necessarily required to which this consumer would otherwise have not contributed.

The load factor value can be, and often is, exaggerated. In most cases large consumers' requirements occur at the time of maximum demand, whether hourly or seasonal. The seasonal load factor can only be of importance when the demand from other consumers is reduced or non-existent, and in this respect it must not be forgotten that a period of reduced demand is necessary for the purpose of executing repairs and renewals, particularly in connection with the carbonizing plant.

It has been put forward that any of these new systems would probably result in a higher charge being made to the small consumers—who are not necessarily the poorer people, as is often assumed—and that such action would encounter strong opposition. It must be remembered, however, that at present by the discount system the small consumer pays a higher net price than some other consumers, and such is economically correct. On the other hand, the small consumer would ultimately decidedly benefit from a revised system of charge that made for the general prosperity of the undertaking as a whole.

Any new system of tariffs should be simple, and give rise to as little suspicion as possible on the part of consumers.

The Committee are of opinion that systems of charge other than the flat rate will become necessary, and recommend that they should continue their labours and present a further report.

With regard to the sliding-scale question, the Committee consider that it should be made lawful, where desired, for companies operating under the sliding-scale to calculate the authorized statutory dividend upon the average price received for gas, instead of upon the gross or initial price. It would prove a very simple change, and a suggestion has been made that the authorized dividend for one half-year or other accountancy period could be governed by the average price received during the preceding period. With alternative tariffs, this variation from present practice would in most cases be a necessity.

It is pointed out most emphatically that in advocating such a change there is no desire or intention to increase the dividends which are payable in relation to the average price obtained at the time of change. The sole object sought is the securing of greater freedom in determining a suitable method of charge, accompanied by no disadvantage to the shareholder as a consequence of a more enterprising commercial policy.

(Signed) C. F. BOTLEY,
Chairman.

GAS REGULATION ACT APPLICATIONS.

There have appeared in the "London Gazette" the following notices regarding applications to the Board of Trade under the Act.

SPECIAL ORDER.

Cleethorpes Gas Company.

To make further provisions with regard to capital and the supply of gas, and for other purposes.

AMENDING ORDER.

Bordon and District Gas Company.

The maximum price now authorized is 19·4d. per therm; and the price which the Company have requested the Board of Trade to substitute for this is the maximum of 22·4d. per therm, as from the date of the application until June 30, 1927, or for such further period as the Board of Trade may determine, dependent on the continuance of the coal stoppage.

Llanidloes Gas, Coal, and Coke Company, Ltd.

To substitute the maximum price of 27·6d. per therm for the existing maximum, from Aug. 1, 1926, until such time as the price of coal again becomes normal.

GLASGOW CORPORATION GAS ACCOUNTS.

In their report to the Glasgow Corporation for the financial year ended May 31 last, the Committee on Gas Supply state that the gross revenue amounted to £1,839,013, as compared with £1,972,007 for the preceding twelve months; while the gross expenditure (including depreciation written off capital assets) was £1,740,153, against £1,773,048. Thus for the year under review the balance carried to profit and loss account was £98,859; the corresponding figures for the previous year being £198,959. After meeting charges for annuities, interest, and sinking fund, the deficit on the past year's operations was £160,121, as compared with £51,194 twelve months ago.

The quantity of coal carbonized during the past year was 696,855 tons, against 668,280 tons for the preceding year, an increase of 28,575 tons. The average cost of coal carbonized was 20s. 2d., being a decrease of 3s. on the preceding year. The quantity of coal gas made per ton of coal carbonized was 13,582 c.ft., which, with water gas, gave an average of 14,215 c.ft., as compared with 13,783 c.ft. and 14,283 c.ft. respectively per ton for the previous year.

The quantity of gas delivered and accounted for during the year was 9,109,508,172 c.ft., as compared with 8,679,445,266 c.ft. for the preceding year, an increase of 430,062,906 c.ft., equal to 4·954 p.ct. The unaccounted-for gas was 8·93 p.ct., against 9·07 p.ct. for the preceding year, a decrease of 0·14 p.ct. The greatest quantity of gas sent out in 24 hours was 42,952,000 c.ft.; while the maximum daily make was 40,382,000 c.ft.

The net sum realized from the sale of coke was £176,405 11s. 8d., being £143,678 18s. 11d. less than that of the preceding year. The total quantity of coke sold was 305,971 tons, compared with 237,147 tons for the previous year, an increase of 68,824 tons. The average price received was just under 15s. 3d. per ton, as compared with 23s. 8d. for the previous year, a decrease of 8s. 5d. per ton.

The number of ordinary meters in use on May 31 last was 194,427, against 193,912 in the preceding year, an increase of 515. The number of prepayment meters in use on May 31 was 108,831, as compared with 108,096 in the preceding year, an increase of 735—giving a net increase of 1250 meters. During the year 27,132 meters were repaired at the workshops. At May 31, 1926, there were on loan 173,782 cookers and range fittings, 21,760 grills, 66,773 boiling burners, 74,229 gas fires on hire, 6002 radiators on hire, and 1830 water heating appliances on hire—a total of 344,376, as compared with 319,987 for the preceding year. The number of gas engines in use was 691, against 723 a year ago.

TRADE NOTES.

Welsbach Literature.

The Welsbach Company's catalogue for the season 1926-27 is a splendid cloth-bound volume. The first section deals with their well-known mantles of all the different types for both low and high pressure use, and inverted and upright burners. It is remarkable how extensive the types of mantles have become, largely through the use of different basic materials, each of which has its own adherents among users. The burner section of the book shows a range which can meet everybody's requirements for all circumstances; and the same applies to the glass section—ornate, plain, and heat resisting. There is now such a glut of beautiful designs that the difficulty is to know which to choose. The same applies to the fittings and lamp sections. The volume shows that the Welsbach Company's enterprise extends to radiators, from gas rings, cookers, grillers, geysers, washing coppers, and mirrors. Two attractive little books are also to hand, describing and illustrating the Welsbach-Kern radiators and "Handiheaters." These booklets are for distribution by the trade to their customers, and are supplied overprinted with the agents' names and addresses.

CONTRACTS OPEN.

Gas-Works Plant.

The Municipal Council of Johannesburg are inviting tenders for the supply of gas-works plant. [See advert. on p. 551.]

Gas Oil Prices.—The "Petroleum Times" reports that the quotation for gas oil is 5⅛d. per gallon, net and naked, *ex* wharf.

CONTRACTS AND FINAL CERTIFICATES.

A Question of Principle—Counsel's Opinion.

At Plymouth the question has been raised as to whether or not when a final certificate is given in connection with a contract for plant, it is binding and unalterable. The point is raised in the report of the Special Committee of the Plymouth Corporation, who for the past six months have been conducting an inquiry into the administration of the various municipal departments. The contract in question referred to gas-works plant; the amount of the contract being £12,523. To the contract were attached various conditions. A final certificate was given in connection with the contract, after which it was found that a sum of close upon £400 had been overpaid to the contractors. A claim was made by the Corporation for its repayment; and a settlement was ultimately arrived at. The Special Committee, however, were not satisfied on the point that the issuing of a final certificate precluded (in the case in question) action being taken for the recovery of an amount overpaid, or that it justified the settlement made on behalf of the Corporation. They, therefore, instructed the Town Clerk to place the points before Counsel, and obtain his opinion thereon. Counsel was asked to advise upon the following questions:

(1) Whether the Engineer had any power to vary the final certificate for £2001, and whether the certificate purporting to vary such final certificate was *ultra vires*.

(2) Whether the Corporation can recover from the Engineer the amount of the over-certification.

Counsel's opinion was as follows:

(1) The rights, duties, and powers of the Engineer depended solely upon the terms of the contract of Oct. 23, 1922. The payments were to be made at certain specified dates "on the Engineer's recommendation." There was no provision for what is commonly called a certificate, which is often made binding as between the parties. It is true that the Engineer made his recommendation in the form of a certificate and recommendation. In my opinion, however, there was nothing in the contract which made that document binding as between the parties; and on a mistake being discovered, the Engineer was entitled to alter his recommendation as to the amount to be paid. Apart from the agreement for the settlement of the dispute between the parties, I see no obligation upon the Corporation to pay any sum beyond the amount actually due when the figures were correctly worked out. It was open to either party when the dispute as to the amount arose to refer the matter to the Engineer under an earlier clause in the contract. The Engineer would then have been bound to give the parties an opportunity of submitting to him their respective contentions, and thereafter to give a decision. Such a decision would, by the terms of the clause, have been binding on both parties; but such a decision was never asked for, and never given. I do not think it would be accurate to describe the document called the final certificate for £2001 as being *ultra vires*; but it had no binding force to compel the Corporation to pay the sum of £2001.

(2) I think that the Engineer, in recommending payment, was fulfilling the duty which he owed to both parties to the contract, and was not acting solely as agent for the Corporation. In these circumstances; I think that, on the authority of *Chambers* v. *Goldthorpe* (1907), 1 K.B., 624, no action would lie against the Engineer for negligence in recommending or certifying an incorrect amount. In this case there is the further difficulty that it is by no means clear that the payment actually made—namely, £1350—was the natural consequence of the recommendation or certificate for £2001.

As a result of their investigations into the contracts and the contractual methods employed, the Committee recommend the Council to adopt the following conditions for application to all future contracts:

(1) All contracts should contain a clause that final payment will not be made until the Borough Treasurer or other officer appointed by the Corporation has examined the accuracy of the accounts and has ascertained that they conform to the conditions and terms of the contract.

(2) A final certificate in connection with any contract shall not be issued on behalf of the Corporation until the Borough Treasurer has examined the final account and certified its financial correctness in writing. The Corporation, or such officer as they may appoint, shall have power to call for any evidence which may be considered material for checking the account.

The Committee also recommend that the standing orders of the Council should provide that each Committee of the Council shall appoint a Tenders Sub-Committee, consisting of not less than six of the members, whose duties shall be as follows:

(*a*) To receive all tenders, which shall be sent under seal addressed to the Town Clerk.

(*b*) After the tenders have been opened at the committee meeting, they should be initialled by the Chairman and referred to the responsible officer for report.

(*c*) The responsible officer should examine all the tenders and all bills of quantities (if any), and after having checked the same report which tender is the lowest.

(*d*) That when tenders are referred specifically to the Chairman, Sub-Committee, or official by a Committee, with power to act, their decision shall be reported and minuted at the next meeting of the Committee.

(*e*) That before contracting for the execution of any works or the purchasing of new materials to the value of £100 or upwards, tenders should be invited by public advertisement.

The Committee further recommend that no contract shall be enlarged or extended without a report to the full Committee, and until a minute confirming such extension or enlargement has been passed by the Council.

COAL PURCHASES FOR THE BELFAST GAS UNDERTAKING.

Mr. J. D. Smith, M.Inst.C.E., J.P., Gas Engineer and Manager to the Belfast Corporation, called upon by the Lord Mayor to make a statement to the Corporation at the meeting on Sept. 1, effectively disposed of allegations that undue preference had been given to German coal over Welsh in the supplies to the gas-works. The matter arose in criticisms by Councillor Midgley of the Gas Committee's action recommending that a letter from Messrs. John R. Noble, Ltd., Belfast, on the subject of coal supplies for the gas-works be marked "read." In moving as an amendment to the minutes the reference back of this item for reconsideration,

Councillor MIDGLEY said that on June 10, early in the coal strike, Messrs. Noble rang up the Gas Manager and asked if he would take 3700 tons of Welsh coal from a certain pit. The reply was that he was not contemplating buying any coal at the moment. A few days afterwards, a boat arrived with a load of German coal, which was supplied to the gas-works. He thought they should have exhausted all Welsh steam coal available before foreign coal was bought. Messrs. Noble wrote asking for the quotations and prices of this foreign coal; but the information was denied them. They made enquiries in the trade, and found no traders locally were asked to submit quotations. He thought the information should have been afforded Messrs. Noble.

The LORD MAYOR, after the motion had been seconded, pointed out that the Manager had full powers of purchase. He thought Mr. Smith would be able to give a good explanation. He could scarcely believe that German coal was given preference if others were available. The Committee had empowered Mr. Smith under the Emergency Orders to purchase coal for the gas-works during the strike, which, he thought, had been a good thing from the point of view of the Corporation and the citizens.

The TOWN CLERK read the minutes of the Committee, which provided that, in view of the emergency which had arisen as a result of the miners' strike, the Manager of the gas-works be authorized to purchase special quantities of coal without inviting public competition, and take such steps as he should deem necessary for the carrying-on of the undertaking.

Councillor M'MULLEN pointed out the Standing Orders were clear on the point that the Corporation must have no dealing with German and Austrian firms. Until that order was revoked, no manager of any Corporation department could enter into business relationships with German or Austrian firms.

Mr. SMITH, called on by the Lord Mayor, said it was perfectly true that Messrs. J. R. Noble, Ltd., had offered him a cargo of coal amounting to about 4000 tons at 46s. per ton. He told them he did not want the cargo; that he was not interested. The reason was that he was buying coal cheaper a few days earlier, and he had no interest in coal at 46s. per ton. That was why he did not buy coal from that firm. A few days afterwards Messrs. Noble wrote to the Town Clerk, and the letter was passed on to him (Mr. Smith) for his reply, which was that he was not aware Messrs. Noble were bringing foreign coal into Belfast, but if they were he would be pleased to have their quotations. Since then, however, that firm had never offered him one ounce of coal. He had had to get something like 30,000 tons to carry on with. Reference had been made to the quality of the coal. Undoubtedly some of the cargoes were not of first-class quality; but they were able to use the coal in a way that was suitable for their purposes. They employed Continental coal until they were able to get coal from America. It was almost a month before they could get the American supply arranged, but supplies were now coming along. The average price that the Committee had paid for coal since the trouble arose was 42s. 6d. per ton, which was very much lower than anything quoted by Messrs. Noble.

Councillor M'MULLEN: What position is the Council in as regards the violation of the Standing Orders through purchasing from a German firm?

The TOWN CLERK: The Corporation have no cognizance of purchasing from a German firm. The Corporation have purchased the coal from Messrs. Kelly & Co., not from any Austrian or German firm.

Councillor M'MULLEN: Messrs. Kelly can purchase from a German or Austrian firm, and the Corporation purchase from Messrs. Kelly.

The TOWN CLERK: I have yet to learn that a person who buys things from another represents that other.

The amendment was defeated and the minutes passed.

Tralee Gas Undertaking.—The gas undertaking at Tralee is again operating, after work having been dislocated for several months owing to a strike. New hands are now employed. Some of the old workers have asked to be taken back, and favourable consideration is understood as likely to be given in certain cases; but feeling in the matter has been aroused by alleged threats of intimidation by local Labour leaders, and by police court proceedings arising therefrom.

Subsidence Causes Fracture in Service Pipe.—The fracture of a gas service pipe through subsidence was the cause of a double fatality, the circumstances of which were inquired into by the South Essex Coroner. Charles Blake (aged 28) and his wife (aged 26), who had been married only a few months, were discovered dead from coal gas poisoning at their residence, Dunromeny, Sunny Down Estate, Harold Wood. Their two dogs were also found dead in the house. Although the gas taps and the meter had been turned off, the place was full of gas, and investigation showed that a service pipe leading into the house under the living-room floor had been fractured. The Jury returned a verdict that death was due to coal gas poisoning as a result of the escape from this fracture, which had been caused by a recent subsidence.

INCREASES IN THE PRICE OF GAS.

Further Results of the Coal Stoppage.

The Batley Town Council have approved an increase in the price of gas by 1·28d. per therm. Mr. D. Stubley (the Chairman of the Gas Committee) said that by the end of September the coal stoppage would have cost the Committee £1942.

At a special meeting of the Belfast Gas Committee—Councillor H. M'Laurin, J.P., presiding—it was decided to recommend the Council to increase the price of gas, after the next survey of meters, by 4d. per 1000 c.ft. The new net price will be 2s. 8d. for lighting and 2s. 9·6d. for high pressure; this being after the deduction of 20 p.ct. discount. The increase was recommended by the Engineer and Manager (Mr. J. D. Smith).

The Bradford Gas Committee announce an advance in the price of gas of 6d. per 1000 c.ft., bringing the charge to 4s. 3d., less discounts.

An advance in price to all classes of consumers of 0·9d. per therm (equivalent to 4½d. per 1000 c.ft.), as from the date of the Michaelmas meter readings, is announced by the Brighton and Hove General Gas Company.

The Burton-on-Trent Gas Committee have decided to recommend the Corporation to increase the price by 1½d. a therm. This represents a little over 7d. per 1000 c.ft.

The Darwen Corporation have resolved to increase the price of gas by 4d. per 1000 c.ft. from Oct. 1.

The Elie and Earlsferry Gas Company have found it necessary to raise their price 10d. per 1000 c.ft., making it 7s. 6d.

The Galashiels Gas Light Company have increased the price by 5d. per 1000 c.ft.

The Gas Light and Coke Company are increasing their price from 9·4d. per therm (3s. 11d. per 1000 c.ft.) to 9·6d. per therm (4s. per 1000 c.ft.), as from the date of the recording of the meter indices for the September quarter.

Members of the Leeds City Council have agreed to the proposal of the Gas Committee to increase the price 6d. per 1000 c.ft.—the Chairman of the Committee (Alderman G. Ratcliffe) giving the assurance that the moment things become normal again it will be the policy of all those now on the Committee to revert to the former price.

On the recommendation of the Gas Committee, the Leek Urban District Council have agreed that, as from the reading of the meters for the September quarter, the price to ordinary consumers in Leek and Rudyard be advanced by 4d. per 1000 c.ft.

After a long discussion, the Manchester City Council agreed to a resolution moved by Sir William Kay (Chairman of the Gas Committee) recommending a temporary increase in price of 6d. per 1000 c.ft. He assured the Council that the Committee will recommend a decrease immediately they are again in a position to purchase coal at their contract rates. The resolution was strenuously opposed by members of the Labour group, on the ground that the increase would fall principally on the shoulders of the poorest classes, who, without electricity, were now dependent upon gas for cooking and even heating. It was also suggested that the increase was unnecessary, as it was likely that within the next few weeks there would be a settlement of the coal dispute. An amendment proposed with the object of allowing unemployed consumers and those in receipt of poor relief to purchase gas at the old rates was ruled out of order by the Town Clerk.

The Marsden Urban District Council have advanced the price of gas 5d. per 1000 c.ft., to date from Oct. 1 to March 31 next.

The New Mills Urban District Council find it necessary to increase the price of gas by 6d. per 1000 c.ft.

The Plymouth Gas Committee propose to increase the price of gas from 2s. 8d. per 1000 c.ft. (or 7·11d. per therm) to 2s. 11d. (or 7·78d. per therm) to ordinary consumers, and from 2s. 5d. to 2s. 8d. for power purposes.

An advance from 1s. 1½d. to 1s. 2½d. per therm has been made by the Pontefract Town Council.

On the proposal of Alderman F. S. Phillips, the Salford City Council have resolved: (1) That from the reading of the meters for the quarter ending Sept. 30 the price of gas to all consumers by ordinary meters within the area of supply be increased by 6d. per 1000 c.ft.; and (2) that from the date of the first collection of coins from each meter after Sept. 30 the price of gas to all consumers by prepayment meters be increased by reducing the quantity supplied for 1d. from 20·87 to 18·38 c.ft.

The Stamford Gas Company have decided to increase the price of gas, as from the September meter reading, by 1d. per therm.

The Wellington (Salop) Gas Company are increasing the price of gas, in the Wellington area, from the end of the September quarter, by a further 2d. per 1000 c.ft. (making 4d. per 1000 c.ft. since June 30), and in the Oakengates area by 4d. per 1000 c.ft. The Board point out that the cost of American and other coal represents an increase of 150 p.ct. on pre-stoppage contracts.

Hebden Bridge and Mytholmroyd Gas Board.—The annual report of the Board for the year ended March 31 shows the gross profit to be £4030, but, after providing for dividend, interest, and sinking fund, there is a net loss of £1820, against a net profit in the previous year of £302. The amount of capital borrowed and stock issued is £122,995, against which £67,050 has been set aside. The total capital expenditure has been £132,037. During the year the amount of gas manufactured was 119,075,000 c.ft., which constitutes a record output for the works. As mentioned in the "JOURNAL" for Aug. 25, in view of the adverse balance and the fact that higher prices are now having to be paid for coal in order to keep the works going, the Board have decided to increase the price of gas by 9d. per 1000 c.ft., making the price for ordinary domestic purposes 4s. 10½d. per 1000 c.ft.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

There has been little further movement pending the outcome of the present negotiations. Local coal owners are not too sanguine about the situation, but once again there is hope that some useful discussion may result.

Prices mentioned here last week have not brought business of any importance, but collieries and exporters cannot do anything until they have some idea as to what are likely to be the production costs on resuming. The local output of coal remains negligible.

COAL TRADE IN THE MIDLANDS.

From Our Local Correspondent.

A better assortment of coal is now being put on the market. Some Nottinghamshire collieries have led the way in bringing the full range of their screening plant into operation again, and the lead thus given is being followed in various directions. The reappearance of properly graded coal is a boon which is specially appreciated by industrialists. Some heat-treatments in the metal working trades have been almost impossible to carry on through lack of the grade of coal required.

With manufacturing activities short-circuited as they are now, there is no acute shortage. The dearth of gas coke is causing more inconvenience at the moment than any other deficiency in the supply. At the works where there are water-gas plants they are, of course, being called in aid to meet the emergency, and there is accordingly less coke for the public.

The belief that a settlement of the dispute in the coalfields is imminent makes consumers very cautious about buying the coal offered in the inflated conditions now prevailing. This is especially the case with the householder, and fears are entertained that it will result in a rush for supplies later on which will be beyond the capacity of the distributing machinery. Such a position might entail serious privation, and regulations are being relaxed and warnings issued that people will be well advised to take such insurance as the control admits of.

Parkinson and W. & B. Cowan, Ltd.

In their 26th annual report, for the year ended March 31 last, which was submitted at the meeting on the 1st inst., the Directors explained that, having sold the gas meter business to Parkinson & Cowan (Gas Meters), Ltd., the Company are now a holding company, controlling and supervising their various subsidiary and associated companies. The accounts therefore no longer show a trading profit, but dividends, &c., received from those companies and from other sources. After paying debenture interest, and providing for depreciation of buildings, the accounts showed a balance of net profit for the year of £69,299. Adding to this the sum brought forward, gave a total of £81,742, of which the preference dividend absorbed (subject to tax) £20,838. The Directors recommended the payment of a final dividend on the old ordinary shares of 5½ p.ct., making, with the interim dividend, a total for the year of 8 p.ct., and a proportionate dividend on the instalments paid up on the ordinary shares issued in 1925 (with tax deducted), leaving £28,608 to be carried forward. During the year under review keen price competition continued in the gas meter trade; but notwithstanding this adverse factor, the Directors were again able to recommend the usual rate of dividend, because of the satisfactory results of the operations of the Company's subsidiary and associated companies. Since June last better prices have been obtained in the gas meter business. The continued growth of certain subsidiaries will necessitate the raising of further capital, and negotiations are in progress for an issue of preference shares by the Parkinson Stove Company, Ltd.

Bradford Corporation Gas Finances.—The annual financial statement of the Bradford City Treasurer relating to the Gas Department shows a decrease of £2500 on the previous year in total income, and from the sale of residuals a decreased return of £33,000, largely due to a reduction in the price of coke. The income from hire and sale of stoves and cookers was £570 more than in the previous year.

Fire at a Tar Works.—The Garscube Chemical Works, adjoining the Dawsholm Gas-Works, Maryhill, Glasgow, were the scene of an outbreak of fire in the early part of last week. Four tanks containing altogether about 90 tons of tar were involved, and the damage is estimated at £1000. The fire was discovered in its early stages by a stillman employed by the Chemical Company—Henry Ellison, Ltd.—and he promptly summoned the brigade.

Cork Gas Company.—Senator J. C. Dowdall, LL.D., presided (in the absence, owing to an accident, of the Chairman, Mr. W. B. Harrington) at the 115th meeting of the Cork Gas Company, and was able to announce that during the past half-year the business had continued to expand. For some time the Company have endeavoured to raise the standard of gas cookery in the city by offering money prizes for competition in the girls' schools; and this year 228 pupils were examined. For 28 years the Company have had the competition of a progressive electrical undertaking; and in the six months just ended the sale of gas was 50 million c.ft. more than for the same period in 1898, which was the half-year immediately preceding the advent of electrical competition. The Directors have confidence that the satisfactory results so far achieved in the face of keen competition can be maintained. Mr. G. W. Norman drew attention to the heavy sum chargeable for rates; and the Chairman replied that the Board were doing all they could, by appealing, to get the amount reduced. A dividend at the usual rate of 8 p.ct. per annum was declared.

CURRENT SALES OF GAS PRODUCTS

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Sept.* 6.

The tar products market continues without material change. It is reported that a certain amount of business has been done in pitch, and the value to-day is in the neighbourhood of 100s. per ton net in bulk at makers' works.

The price of tar has advanced materially, owing to the short supply and consequent increase in working costs to the tar distiller.

Creosote is firm at about 7¾d. per gallon in bulk at makers' works.

Pure toluole is in demand, and supplies are scarce. The price is about 3s. 6d. to 3s. 9d. per gallon filled into buyers' drums. Pure benzole is firm at about 3s. to 3s. 3d. per gallon, and solvent naphtha is steadier at 2s. 3d. to 2s. 4d. per gallon for 95/160 quality.

Tar Products in the Provinces.

Sept. 6.

Markets for tar products have remained firm throughout the past week.

There is still a fair amount of demand for pitch, and the price has improved somewhat.

The average values of gas-works products during the week were: Gas-works tar, 71s. 6d. to 76s. 6d. Pitch, East Coast, 102s. 6d. to 105s. f.o.b. West Coast—Manchester, 95s. to 97s. 6d.; Liverpool, 97s. 6d. to 100s.; Clyde, 101s. to 103s. Benzole, 90 p.ct. North, 1s. 11d. to 2s.; crude, 65 p.ct. at 120° C., 1s. 4d. to 1s. 5d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 11d. to 2s. Toluole, naked, North, 1s. 11d. to 2s. nominal. Coal-tar crude naphtha, in bulk, 9d. to 9½d. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, in bulk, North, liquid, 7d. to 7¼d.; salty, 6¾d. to 7d.; Scotland, 6¾d. to 7d. Heavy oils, in bulk, North, 7¼d. to 7¾d. Carbolic acid, 1s. 4d. to 1s. 5d. prompt. Naphthalene, £11 to £14; salts, 90s. to 100s., bags included. Anthracene "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Borrowing Powers at Accrington.—The Accrington District Gas Board have received sanction from the Ministry of Health to their application for power to borrow £27,000 for extensions to plant and mains. At the inquiry there was some criticism of the Board's finances; but the Ministry have granted power to borrow the whole amount asked for, and have also allowed the full period for repayment.

Windermere District Gas and Water Company.—The net profit for the past half-year amounts to £580. The balance of profit and loss account is £2703; and out of this it is proposed to pay the following dividends: On 100 £10 (fully paid) 4 p.ct. preference shares for six months, £20; on 335 £10 (fully paid) new 6 p.ct. preference shares for six months, £100 10s.; and on 1250 £10 (fully paid) ordinary shares at 7 p.ct. per annum for six months, £437 10s. This will, after deducting income-tax, leave a balance to carry forward of £2256.

Electricity in Gas-Works.—In connection with the installation of a Sulzer coke cooling plant at the new gas-works of the Burnley Corporation, a rather unusual situation has arisen. The Gas Committee require a supply of electricity to operate the plant, and according to the makers it should be direct current. They asked the Corporation Electricity Committee to supply them; and they have offered alternating current. To have that transformed and reduced in voltage would make the cost more than the Gas Committee desired. The Electricity Committee have offered very low terms, in their opinion, but the Gas Committee consider that, having plenty of waste heat from the Sulzer plant, they could produce their own energy cheaper. The Committees spent several hours over the question, and eventually the Gas Committee decided to instal their own generating plant, at a cost of £2000. When this proposal came forward at the Council meeting, the minute was referred back, so that the Corporation could bring in an expert to decide the question of whether it was really necessary, as the contractors said, to run the machinery by direct current.

The Directors of the European Gas Company, Ltd., have decided to pay, on Oct. 1, an interim dividend of 3s. per share, free of tax.

The Directors of the Dundalk Gas Company have declared a dividend of 20s. per share on the "A" shares, and one of 15s. per share on the "B" shares.

The Hastings and St. Leonards Gas Company are paying interim dividends at the following rates: 5 p.ct. converted stock, at £6 15s. p.ct. per annum; 3½ p.ct. converted stock, at £5 5s. p.ct. per annum; and 5 p.ct. additional stock, at £6 4s. p.ct. per annum.

Councillor Porter reported to the Blackburn Town Council that in five years the Corporation had sold 8750 cookers. In August alone 239 new cookers were fixed. He commended the policy of the Gas Department in carrying out gas installation and repairs themselves, instead of allowing the work to be done by private contractors. He advocated a similar system in the Electricity Department; but the Town Council decided to adopt a recommendation that electrical installations should be carried out by private contractors.

The annual outing of the staff of Messrs. Falk, Stadelmann, & Co., Ltd., of Veritas House, Birmingham, took place on Saturday, Aug. 28, when a party numbering 34 proceeded to Evesham. Immediately on arrival, tea was provided at the Northwick Hotel, where they were joined by the Chairman of the Company (Mr. Max Falk), who, in a happy speech, welcomed them all on behalf of the firm, and expressed his appreciation of the genuine feeling of goodwill that existed among the whole of the employees in Birmingham. A trip on the River Avon was followed by a delightful drive home.

STOCK MARKET REPORT.

THE general condition remained about the same on the Stock Exchange last week, and, after making allowances for the holiday season, the volume of business was fairly satisfactory. Home Rails, which appear to be the barometer of the coal trouble, and move up and down in accordance with the current rumours, were, in spite of the poor earnings, marked-up. The optimistic views extended to other markets; and there is little doubt that quiet buying was in progress all round in anticipation of a speedy settlement of the long drawn-out dispute. The week-end news, however, was not so hopeful; but, on the other hand, it is reported that the price of foreign coal for November delivery is easing. Gilt-edged stocks were firm, particularly the 5 p.ct. War Loan and Victory Bonds. The Foreign Market was normal, and did not appear to be affected by the League of Nations discussion; only French Rents and Rails were at all prominent.

The Industrial and Miscellaneous Markets were varied. Eastwoods were in demand on the increased dividend announcement, and Artificial Silks revived slightly; but Engineering issues, on the other hand, continued to be depressed. Tobaccos, as usual, were well supported, particularly Godfrey Phillips, which rose to 5$\frac{1}{16}$.

In the Gas Market buying increased. It is clear that prices, by reason of the coal strike, have touched bottom, and there are signs of an upward turn. The improvements in the quotations of the ordinary stocks during the week included: Alliance and Dublin Ord., 2 points to 82-87; Commercial 4 p.ct., 1 point to 77-80; Gas Light and Coke, ord., $\frac{1}{2}$ point to 83$\frac{1}{2}$-85$\frac{1}{2}$; Hastings and St. Leonards, 5 p.ct., 1 point to 87-92; Imperial Continental Cap., 2 points to 122-127; Liverpool 5 p.ct., $\frac{3}{4}$ point to 79-80.

The following transactions were recorded during the week:

On Monday, Aldershot 4 p.ct. preference 66, 66$\frac{1}{4}$, Alliance and Dublin 4 p.ct. debenture 65, British 104$\frac{3}{4}$, European 98s. 9d., Gas Light and Coke 4 p.ct. 83$\frac{3}{4}$, 84, 84$\frac{1}{4}$, 4 p.ct. preference 75$\frac{3}{4}$, 76, Imperial Continental 123$\frac{1}{2}$, Primitiva 10s. 6d., 10s. 9d., 10s. 10$\frac{1}{4}$d., South Suburban 5 p.ct. debenture 94, Swansea 7 p.ct. preference 90$\frac{1}{2}$. Supplementary prices, Gas Light and Coke 5 p.ct. debenture 99, 99$\frac{1}{4}$, Montevideo 6 p.ct. debenture 97$\frac{3}{4}$, 98$\frac{1}{4}$.

On Tuesday, Alliance and Dublin 4 p.ct. debenture 65$\frac{7}{8}$, Gas Light and Coke 4 p.ct. 84, 84$\frac{1}{8}$, 84$\frac{1}{2}$, 84$\frac{5}{8}$, 84$\frac{3}{4}$, 4 p.ct. preference 75$\frac{1}{2}$, 76, Montevideo 79$\frac{3}{4}$, Primitiva 10s. 6d., 10s. 10$\frac{1}{2}$d., South Metropolitan 91$\frac{1}{4}$, South Suburban 96$\frac{1}{2}$, Swansea 7 p.ct. preference 100$\frac{1}{2}$. Supplementary prices, Gas Light and Coke 5 p.ct. debenture 99.

On Wednesday, Alliance and Dublin 83, Bournemouth 7 p.ct. 11$\frac{7}{8}$, 6 p.ct. preference 11$\frac{1}{4}$, Commercial 4 p.ct. 79, European 97s. 6d., Gas Light and Coke 84$\frac{1}{4}$, 84$\frac{3}{8}$, 84$\frac{1}{2}$, 84$\frac{5}{8}$, 4 p.ct. preference 75$\frac{1}{4}$, 3 p.ct. debenture 58$\frac{1}{2}$, Imperial Continental 123$\frac{1}{2}$, 124$\frac{1}{4}$, Primitiva 10s. 9d., 11s. 3d., South Metropolitan 91$\frac{1}{2}$, 6$\frac{1}{2}$ p.ct. debenture 104, South Suburban 5 p.ct. 96$\frac{1}{4}$, Wandsworth "A" 123, "B" 103, 3 p.ct. debenture 54$\frac{1}{2}$. Supplementary prices, Brighton and Hove 7 p.ct. new debenture 101, Gas Light and Coke 5 p.ct. debenture 99, 99$\frac{1}{4}$.

On Thursday, Cape Town 4$\frac{1}{2}$ p.ct. debenture 71$\frac{7}{8}$, Gas Light and Coke 4 p.ct. 84$\frac{3}{8}$, 6 p.ct. debenture 103$\frac{1}{4}$, 104, Montevideo 80$\frac{1}{4}$, Newcastle 3$\frac{1}{2}$ p.ct. 68$\frac{3}{4}$, Primitiva 11s. 6d., South Metropolitan 91$\frac{1}{2}$, 91$\frac{7}{8}$, 92, South Suburban 96$\frac{1}{2}$. Supplementary prices, Brighton and Hove 4 p.ct. preference 67, Cape Town 5 p.ct. debenture 71, Croydon 6 p.ct. debenture 99$\frac{1}{2}$, Felixstowe 7 p.ct. preference 96, 96$\frac{1}{2}$, Gas Light and Coke 5 p.ct. debenture 99, 99$\frac{3}{8}$, 99$\frac{1}{4}$, Rochester, Chatham, 82, 82$\frac{1}{2}$.

On Friday, British 104$\frac{3}{4}$, Commercial 4 p.ct. 70$\frac{1}{2}$, European 5$\frac{1}{4}$, Gas Light and Coke 4 p.ct. 84$\frac{3}{8}$, 84$\frac{1}{2}$, 84$\frac{3}{8}$, 84$\frac{7}{8}$, 4 p.ct. preference 75$\frac{1}{4}$, 3 p.ct. debenture 58$\frac{1}{4}$, Imperial Continental 125, Malta and Mediterranean 5$\frac{1}{2}$, Primitiva 11s. 6d., 11s. 9d., South Metropolitan 91$\frac{3}{4}$, 3 p.ct. debenture 58$\frac{3}{4}$, South Suburban 5 p.ct. 96, 97, 5 p.ct. debenture 94, 95. Supplementary prices, Brentwood 6 p.ct. preference 94, 94$\frac{1}{2}$, Brighton and Hove 5 p.ct. debenture 94$\frac{1}{2}$, 95, Gas Light and Coke 5 p.ct. debenture 99$\frac{1}{2}$, 99$\frac{1}{4}$, Gas Light and Coke (Brentford) 6 p.ct. 99$\frac{1}{2}$, 99$\frac{3}{4}$, Gas Light and Coke 7$\frac{1}{2}$ p.ct. 105, Montevideo 6 p.ct. debenture 98$\frac{1}{4}$.

In Lombard Street money was plentiful throughout the week; but at the close the lowest reported for fresh loans was 3$\frac{1}{2}$ p.ct., the bulk of the business being done at 3$\frac{3}{4}$ p.ct. Discount quotations were easier, but banks reported buyers of October bills at 4$\frac{5}{16}$ p.ct. This circumstance and the fact that Treasury Bills averaged £4 13s. 0·4d., or 1s. 3d. p.ct. lower than the previous week, brought about a firmer tendency at the close.

In the Foreign Exchange Market, a general improvement earlier in the week was followed by a reaction in values. French francs, which cheapened to 165$\frac{1}{2}$, appeared to be affected by the Bank of France return. The Brussels rate rose to 165$\frac{1}{2}$, Italian lire were steady at 130$\frac{1}{2}$, and Sterling on New York remained firm, finishing at 4.85\frac{21}{32}$.

Silver was cheaper on China selling, the price declining to 28$\frac{9}{16}$d. per oz. Gold was nominally 84s. 11$\frac{1}{2}$d. per oz.; no supplies being available.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on Dec. 3. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3$\frac{1}{2}$ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Sept. 3.	Rise or Fall on week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
171,978	Stk.	Aug. 12	5	5	Aldershot 5 p.c. max. C.	72—75	..	..
322,992	,,	,,	4	4	Do. 4 p.c. Pref.	65—70	..	..
1,551,868	,,	Apl. 1	6½	6½	Alliance & Dublin Ord.	82—87	..	66—66½
374,000	,,	July 8	4	4	Do. 4 p.c. Deb.	62—67	+2	23
300,000	1	May 6	1/7½	1/7½	Bombay, Ltd.	1⅝—1¹⁵⁄₁₆	+2	65-65⅞
170,000	10	Aug. 26	8½	8½	Bournemouth 5 p.c.	113—122*	..	..
500,050	10	,,	7	7	Do. B 7 p.c.	113—124*	..	..
275,000	10	,,	6	6	Do. Pref. 6 p.c.	11—12*	−½	11⅞
50,000	Stk.	June 24	3	3	Do. 3 p.c. Deb.	54—57	..	11¼
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	74—77	..	..
214,740	,,	Aug. 26	12	12	Brighton & Hove Orig.	163—168*	..	..
244,200	,,	,,	9	9	Do. A Ord.	125—130*	..	..
1,287,500	,,	July 23	5	5	Bristol 5 p.c. max.	86—87a	..	..
855,000	,,	Mar. 18	8	7	British Ord.	100—105	..	..
100,000	,,	June 24	7	7	Do. 7 p.c. Pref.	114—119	..	104½
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	68—73	..	..
100,000	10	June 10	6	8	Cape Town, Ltd.	6½—7⅛	..	..
100,000	10	Apl. 22	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
150,000	Stk.	June 24	4½	4½	Do. 4½ p.c. Deb.	68—73	..	..
626,860	,,	July 22	6	6	Cardiff Con. Ord.	94—97	+2	71⅞
237,860	,,	June 24	7½	7½	Do. 7½ p.c. Red. Deb.	99—102	..	..
157,150	,,	Aug. 12	6½	5	Chester 5 p.c. Ord.	88—93b	..	..
79,185	1	Apl. 22	12/-	12/-	Colombo Ltd. Ord.	28/—30/-	..	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	20/—22/-	..	..
1,013,280	Stk.	Aug. 12	5⅞	5½	Commercial 4 p.c. Cap.	77—80	..	..
560,000	,,	,,	5/8¼	5/8¼	Do. 3½ p.c. Cap.	74—77	+1	79—79½
475,000	,,	June 24	3	3	Do 3 p.c. Deb.	55—58	..	..
800,000	,,	Oct. 8	—	4	Continental Union, Ltd.	25—30	..	..
200,000	,,	Mar. 4	7	7	Do. 7 p.c. Pref.	85—88	..	..
737,150	,,	Aug. 12	6½	6½	Croydon sliding scale	94—97	..	..
403,100	,,	,,	5	5	Do. max. div.	77—80	..	..
492,270	,,	Aug. 26	6	9	Derby Con.	107—109e*	..	..
55,000	,,	June 24	4	4	Do. Deb.	73—75c	..	..
309,000	,,	Mar. 4	5	5	East Hull Ord. 5 p.c.	86—89	..	..
50,000	,,	June 24	5	5	Eastbourne 5 p.c. Deb.	91—96	..	..
1,009,180	10	Apl. 1	†6	†4	European, Ltd.	4¼—5¼	..	..
13,788,960	Stk.	Aug. 12	4/17/4	5/1/4	Gas Light & Coke 4 p.c. Ord.	83½—85½	+⅛	97/6—102/6
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	58—61	..	88¾—84⅞
4,157,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	74—77	..	..
5,602,620	,,	June 24	3	3	Do. 3 p.c. Con. Deb.	58—61	..	75½—76
181,315	,,	,,	—	—	Do. 6 p.c. Br'tf'd Rd. Db.	100—105	..	58½
130,000	,,	,,	10	10	Do. 10 p.c. Bonds.	..	..	103½—104
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	—	6⅔	6⅔	Hastings & St L. 5 p.c. Conv	87—92*	..	..
258,740	,,	Aug. 26	5½	6½	Do. 3½ p.c. Conv.	66—71*	+1	..
70,000	10	,,	†10	†10	Hongkong & China, Ltd.	19½—20⅛	..	..
173,200	Stk.	June 10	5	5	Hornsey Con. 3½ p.c.	69—71	..	..
1,976,000	,,	Mar. 4	10	†10	Imperial Continental Cap.	122—127	..	..
226,170	,,	May 20	8½	8½	Do. 3½ p.c. Red. Deb.	68—71	+2	123½—125
235,242	,,	Aug. 12	6½	6½	Lea Bridge 5 p.c. Ord.	92—97	..	..
2,127,340	,,	Aug. 12	5½	5½	Liverpool 5 p.c. Ord.	79—80b	+¾	..
600,000	,,	Aug. 12	6	6	Do. 7 p.c. Red. Pref.	102⅛—104⅛b	..	..
165,736	,,	Mar. 18	7	7	Maidstone 5 p.c. Cap.	112—117*	..	..
63,480	,,	Aug. 26	9	8	Do. 3 p.c. Deb.	53—58	..	..
75,000	,,	June 24	3	3	Malta & Mediterranean	5¼—5⅜	..	..
541,920	Stk.	June 24	†6	†7	Montevideo, Ltd.	79—82	..	5½
2,061,315	,,	May 20	†4	†6	Newcastle & Gateshead Con.	69¼—70d	+¼	79¾—80½
360,929	,,	Aug. 12	5	5	Do. 4 p.c. Pref.	73—74d	+¼	68⅞
539,705	,,	,,	4	4	Do. 3½ p.c. Deb.	62½—69d	..	..
15,000	,,	June 24	3½	3½	North Middlesex 10 p.c.	151—156*	..	..
91,530	,,	Aug. 26	11¼	11¼	Do. 7 p.c.	109—114*	..	..
300,000	Stk.	,,	8⅛	8⅛	Oriental, Ltd.	96—101	..	..
188,120	,,	May 6	9	7	Plym'th & Ston'house 5 p.c.	108—113	..	..
60,000	,,	June 24	7⅞	7⅞	Portsea Island B	—	..	..
100,000	50	Mar. 4	1¼	1¼	Do. C	—	..	..
2,289,909	50	,,	13	13	Primitiva Ord.	11/—12/-	..	..
282,200	1	—	—	—	Do. 4 p.c. Red. Deb.	83—85	+1/-	10/6—11/9
600,000	100	June 1	4	4	Do. 4 p.c. Red. Deb. 1911	65—67	..	..
180,305	Stk.	July 22	4	4	Do. B. Aires 4 p.c. Rd. Db.	65—67	..	..
256,847	,,	June 24	4	4	Do. R'r P'te 4 p.c. Rd. Db.	65—67	..	..
150,000	,,	,,	4	4	San Paulo 6 p.c. Pref.	7⅞—8¼	..	..
125,000	10	Mar. 18	6	6	Do. 5 p.c. Red. Deb.	44—47	..	..
270,000	50	July 1	5	5	Sheffield A	99—101e	..	..
419,968	Stk.	Mar. 18	5½	6	Do. B	99—101e	..	..
1,047,000	,,	,,	5½	6	Do. C	99—101e	..	..
90,000	,,	,,	5½	6	South African	5—7	..	..
6,609,895	Stk.	June 11	4	—	South Met. Ord.	90¾—92½	..	..
1,895,445	,,	Aug. 12	7	5	Do. 3 p.c. Deb.	57—60	..	91½—92
734,000	,,	July 8	8	8	Do. 6½ p.c. Red. Db.	102—104	..	58⅜
91,500	,,	Mar. 4	6½	6½	South Shields Con.	114—116d	..	104
1,187,795	,,	Aug. 12	8½	8½	South Suburban Ord. 5 p.c.	95—98	..	..
368,837	,,	Aug. 12	6½	6½	Do. 5 p.c. Deb.	92—95	..	96—97
647,740	,,	June 24	5	5	South'mpton Ord. 5 p.c. max.	77—80	..	94—95
121,275	,,	Mar. 18	5	5	Do. 4 p.c. Deb.	68—73	..	..
250,000	,,	June 24	4	4	Swansea 7 p.c. Red. Pref.	100—102*	..	..
200,000	,,	Aug. 26	7	7	Do. 6½ p.c. Red. Deb.	100—102	+1⅛	99½—100½
120,000	,,	June 24	6½	6½	Tottenham District A 5 p.c.	105—110	+1	..
882,275	,,	July 22	7⅛	7⅛	Do. B 3½ p.c.	87—90	..	..
150,000	,,	,,	5½	6½	Do. 5½ p.c. Pref.	99—101	..	..
181,255	,,	,,	5½	5½	Do. 4 p.c. Deb.	73—76	..	..
258,251	,,	June 10	4	4	Tynemouth Con. and New	65½—66½d*	−2	..
	,,	Aug. 26	5	5	Uxbridge, Maidenhead, & Wycombe 5 p.c.	85—90*	..	..
197,294	,,	Aug. 26	6⅝	6⅝	Do. 5 p.c. pref.	80—85*	..	..
88,330	,,	,,	5	5	Do. 5 p.c. Maidenh'd	85—90*	..	..
91,800	,,	,,	6⅝	6⅝	Wandsworth, Wimbledon, and Epsom—			
30,000	,,	July 8	8½	8½	Wandsworth A 5 p.c.	122—127	..	..
355,636	,,	,,	7	7	Do. B 3½ p.c.	102—107	..	123
412,450	,,	,,	5/19/0	5/19/0	Do. C and New	88—93	..	103
362,000	,,	,,	6⅝	6⅝	Wimbledon 5 p.c.	98—103	..	..
98,000	,,	,,	7½	7½	Epsom 5 p.c.	104—109	..	..
88,416	,,	June 24	3	3	3 p.c. Deb.	54—57	..	54½

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